

# HP StorageWorks

## Fabric OS 5.x MIB reference guide

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Fabric OS 5.x MIB reference guide

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# About this guide

This guide provides information about:

- MIB-II
- FE MIB objects
- Entity MIB objects
- SW MIB objects
- High-availability MIB objects
- FibreAlliance MIB objects

---

 **NOTE:** FICON is not supported on HP B-Series Fibre Channel switches. The FICON information in this document is included for reference only.

---

## Intended audience

This guide is intended for:

- System administrators responsible for setting up HP StorageWorks Fibre Channel Storage Area Network (SAN) switches
- Technicians responsible for maintaining the Fabric Operating System (OS)

## Related documentation

Documentation, including white papers and best practices documents, is available on the HP web site:

<http://www.hp.com/country/us/eng/prodserv/storage.html>.

---

**IMPORTANT:** For late breaking, supplemental information, access the latest version of the *HP StorageWorks Fabric OS 5.x release notes* using the following steps.

---

To access current Fabric OS related documents:

1. Locate the **IT storage products** section of the web page.
2. Under **Networked storage**, click **SAN infrastructure**.
3. From the **SAN Infrastructure** web page, locate the **SAN Infrastructure products** section.
4. Click **Fibre Channel Switches**.
5. Locate the **B-Series Fabric-Enterprise Class** section. Click **4/256 SAN Director and 4/256 SAN Director power pack**, to access Fabric OS 5.x documents (such as this document).  
The switch overview page displays.
6. Go to the **Product Information section**, located on the right side of the web page.
7. Click **Technical documents**.
8. Follow the onscreen instructions to download the applicable documents.

## HP StorageWorks Fabric OS 5.x master glossary

This guide uses industry standard SAN terminology. However, some terms are intrinsic to Fabric OS 5.x. See the *HP StorageWorks Fabric OS 5.x master glossary* for a complete list of terms and definitions.

Access the master glossary from the HP StorageWorks SAN Switch Documentation CD that shipped with your switch. Also, access from the HP web site using the procedure outlined in "[Related documentation](#)."

# Document conventions and symbols

**Table 1** Document conventions

Convention	Element
Medium blue text: <a href="#">Figure 1</a>	Cross-reference links and e-mail addresses
Medium blue, underlined text ( <a href="http://www.hp.com">http://www.hp.com</a> )	Web site addresses
<b>Bold font</b>	<ul style="list-style-type: none"><li>• Key names</li><li>• Text typed into a GUI element, such as into a box</li><li>• GUI elements that are clicked or selected, such as menu and list items, buttons, and check boxes</li></ul>
<i>Italics font</i>	Text emphasis
Monospace font	<ul style="list-style-type: none"><li>• File and directory names</li><li>• System output</li><li>• Code</li><li>• Text typed at the command-line</li></ul>
<i>Monospace, italic font</i>	<ul style="list-style-type: none"><li>• Code variables</li><li>• Command line variables</li></ul>
<b>Monospace, bold font</b>	Emphasis of file and directory names, system output, code, and text typed at the command line

---

 **WARNING!** Indicates that failure to follow directions could result in bodily harm or death.


---

---

 **CAUTION:** Indicates that failure to follow directions could result in damage to equipment or data.


---

---

 **IMPORTANT:** Provides clarifying information or specific instructions.

---

---

 **NOTE:** Provides additional information.

---

---

 **TIP:** Provides helpful hints and shortcuts.

---

## HP technical support

Telephone numbers for worldwide technical support are listed on the HP support web site:  
<http://www.hp.com/support/>.

Collect the following information before calling:

- Technical support registration number (if applicable)
- Product serial numbers
- Product model names and numbers
- Applicable error messages

- Operating system type and revision level
- Detailed, specific questions

For continuous quality improvement, calls may be recorded or monitored.

HP strongly recommends that customers sign up online using the Subscriber's choice web site:

<http://www.hp.com/go/e-updates>.

- Subscribing to this service provides you with e-mail updates on the latest product enhancements, newest versions of drivers, and firmware documentation updates as well as instant access to numerous other product resources.
- After signing up, you can quickly locate your products by selecting **Business support** and then **Storage** under Product Category.

## HP-authorized reseller

For the name of your nearest HP-authorized reseller:

- In the United States, call 1-800-282-6672.
- Elsewhere, visit the HP web site: <http://www.hp.com>. Then click **Contact HP** to find locations and telephone numbers.

## Helpful web sites

For other product information, see the following HP web sites:

- <http://www.hp.com>
- <http://www.hp.com/go/storage>
- <http://www.hp.com/support/>
- <http://www.docs.hp.com>



# 1 Understanding HP SNMP

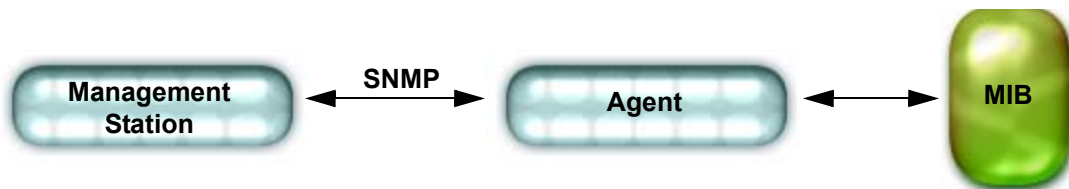
The Simple Network Management Protocol (SNMP) is an industry-standard method for monitoring and managing network devices. This protocol promotes interoperability, as SNMP-capable systems must adhere to a common set of framework and language rules. Understanding the components of SNMP makes it possible to use third-party tools to view, browse, and manipulate HP switch variables (MIBs) remotely, as well as to set up an enterprise-level management process. Every HP StorageWorks switch or director supports SNMP.

This chapter discusses the following:

- [Understanding SNMP basics](#) next
- [Loading HP MIBs](#), page 32

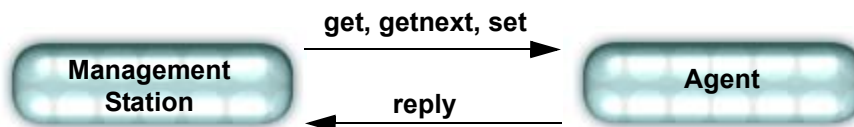
## Understanding SNMP basics

Every HP StorageWorks switch carries an agent and management information base (MIB), as illustrated in [Figure 1](#). The agent accesses information about a device and makes it available to an SNMP network management station.



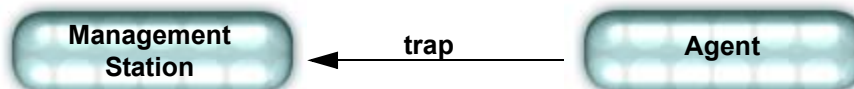
**Figure 1** SNMP structure

When active, the management station can get information or set information when it queries an agent. SNMP commands, such as `get`, `set`, `getnext`, `setnext`, and `getresponse` are sent from the management station, and the agent replies once the value is obtained or modified (see [Figure 2](#)). Agents use variables to report such data as the number of bytes and packets in and out of the device, or the number of broadcast messages sent and received. These variables are also known as *managed objects*. All managed objects are contained in the MIB.



**Figure 2** SNMP query

The management station can also receive traps (unsolicited messages from the switch agent) if an unusual event occurs. See [Figure 3](#) and "[Understanding SNMP traps](#)" on page 31 for more information.



**Figure 3** SNMP trap

The agent can receive queries from one or more management stations and can send traps to up to six management stations.

## Understanding MIBs

The MIB is a database of information monitored and managed on a device, in this case an HP StorageWorks switch. The MIB structure can be represented by a tree hierarchy. The root splits into three main branches: International Organization for Standardization (ISO), Consultative Committee for International Telegraph and Telephone (CCITT), and joint ISO/CCITT. These branches have short text strings and integers (OIDs) to identify them. Text strings describe object names, while integers allow software to create compact, encoded representations of the names.

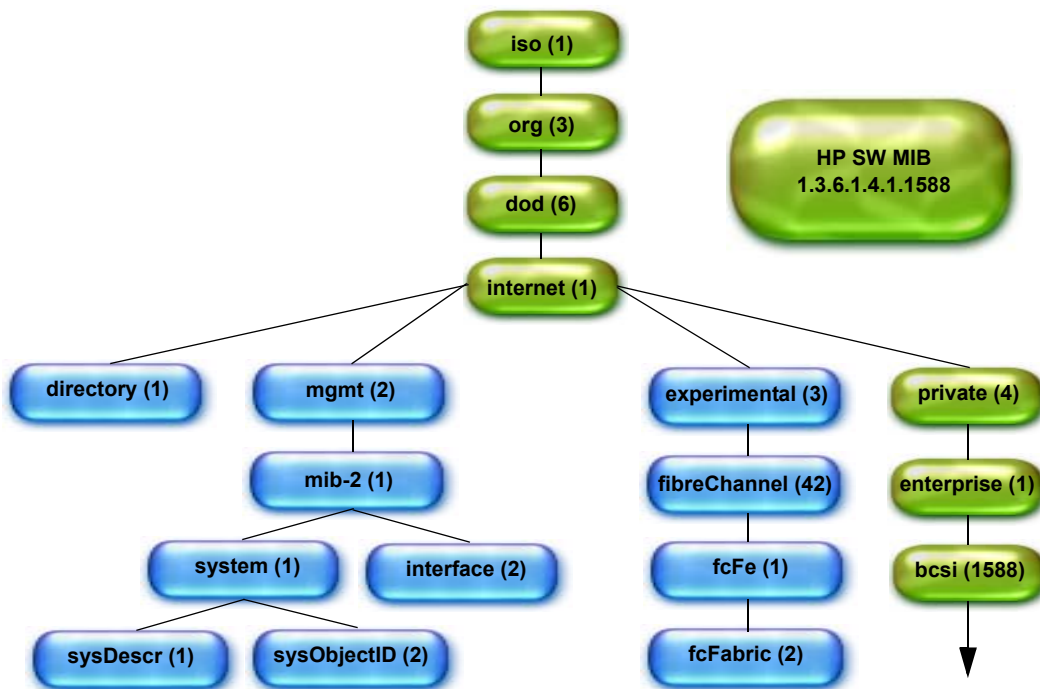
Each MIB variable is assigned an object identifier (OID). The OID is the sequence of numeric labels on the nodes along a path from the root to the object. For example, as shown in [Figure 4](#), the HP SW.MIB OID is:

```
1.3.6.1.4.1.1588
```

The corresponding name is:

```
iso.org.dod.internet.private.enterprise.bcsi
```

The other branches are part of the standard MIBs. The portions relevant to configuring SNMP on an HP StorageWorks switch are referenced in the remainder of this manual.



**Figure 4** HP MIB tree location

Use a MIB browser to access the MIB variables; all MIB browsers perform queries and load MIBs.

Since different vendors vary the information in their private enterprise MIBs, it is necessary to verify their information. The Fibre Channel MIB standards dictate that certain information be included in all MIBs; it is the vendor's responsibility to follow the standards. The standards are:

- FibreAlliance (FA) MIB: HP supports version 3.0.
- Fabric Element (FE) MIB: accepted by the Internet Engineering Task Force (IETF).

HP supports FE\_RCF2837.mib under the MIB-II branch in Fabric OS 4.x, 3.2.0, and 3.1.x and the experimental version, FE\_EXP.mib, in Fabric OS 2.6.x and 3.0.x. This latest version of the FE MIB references the FRAMEWORK.MIB and, based on the MIB browser, it is necessary to load this MIB before the FE.MIB. See "[Loading HP MIBs](#)" on page 32 for more information.

Once loaded, the MAX-ACCESS provides access levels between the agent and management station. The access levels are as follows:

- Not-accessible: You cannot read or write to this variable.
- Read-create: Specifies a tabular object that can be read, modified, or created as a new row in a table.
- Read-only - Public: You can only monitor information.
- Read-write - Private: You can read or modify this variable.

## Understanding SNMP traps

An unsolicited message that comes to the management station from the SNMP agent on the device is called a *trap*. HP StorageWorks switches send traps out on UDP port 162 only, therefore, an SNMP management application must be running on UDP port 162. In order to receive traps, the management station IP address and severity level must be configured on the switch. Up to six trap recipients can be configured using Web Tools or the `snmpConfig` command. You can define a different message severity level for each of the recipients, so that some recipients receive all trap messages and others receive only the most critical.

There are two main MIB trap choices:

- FA MIB trap - Associated with the FA MIB (FA-MIB), this MIB manages SAN switches and devices from any company that complies with FA specifications.
- HP-specific MIB trap - Associated with the HP-specific MIB (SW-MIB), manages HP StorageWorks switches only.

The functionality of these MIBs have some overlap. If you enable both SW-MIB and FA-MIB traps, you might receive duplicate messages for switch events that trigger the trap.

You can also use these additional MIBs and their associated traps: high-availability MIB (HA-MIB); FICON-MIB; and SW-EXTTRA. You can use the `snmpConfig` command to disable the FA-MIB, HA-MIB, FICON-MIB, and SW\_EXTTRA; but neither the SW-MIB or the FE-MIB can be disabled.

An event trap (`swEventTrap`, `connUnitEventTrap`, or `swFabricWatchTrap`) is basically an error message (`errShow` output) that is SNMP formatted and delivered.

## FA traps

Consider enabling this trap if you want to use SNMP to monitor multiple connectivity units including HP StorageWorks switches.

The `switchStatusPolicySet` command determines the FA-TRAP switch status related outputs:

- `connUnitStatusChange`
- `connUnitSensorStatusChange`
- `connUnitPortStatusChange`

The MIB-II system description `swEventTrapLevel` determines the output for the `connUnitEventTrap`. Events in the Error Log of a severity at or above the configured threshold will generate SNMP traps.

The FibreAlliance Trap (FA-TRAP) can be configured to send traps using the `snmpConfig` command. See the *HP StorageWorks Fabric OS 5.x command reference guide* for more information on this command.

## HA traps

Consider enabling these traps to monitor Field Replaceable Unit (FRU) status and Control Processor (CP) status when you have an HP StorageWorks director in your environment:

- **fruStatusChanged:** This trap is generated by a FRU status change, such as a switch reboot or adding or removing a FRU component.
- **cpStatusChanged:** This trap is generated by a change in the status of a CP, including a reboot, or firmware download.
- **fruHistoryTrap:** This trap is generated when a FRU is added or removed.

The high-availability trap (HA-TRAP) can be configured to send traps using the `snmpConfig` command. See the *HP StorageWorks Fabric OS 5.x command reference guide* for more information on this command.

## SW traps

There are six specific traps defined in HP SW-TRAP:

- **swfault** (no longer supported)
- **swSensorScn** (no longer supported)
- **swFCPortScn**: This trap is generated by a port state change.
- **swEventTrap**: This trap is generated by any switch event reported to the system error log.
- **swFabricWatchTrap**: This trap is generated when any Fabric Watch threshold is reached.
- **swTrackChangesTrap**: This trap is generated by a login or a logout.

The SW-TRAP can be configured to send traps using the `snmpConfig` command. See the *HP StorageWorks Fabric OS 5.x command reference guide* for more information on this command.

## Object instances


MIB objects are defined by the OID, which is the type of object, and by the instance number, which is an instance of that MIB object. A Fibre Channel port is a MIB object, and port 0 is an instance of that object. The following is an OID number and an instance number:

1.3.6.1.4.1.1588.2.1.1.1.6.2.1.11.5

where:

1.3.6.1.4.1.1588.2.1.1.1.6.2.1.11 is the object ID (of `swFCPortTxWords`) and  
5 is the instance ID for port 4.

---

 **NOTE:** You must add 1 to the port number to get its instance number in SNMP, because SNMP numbering starts at 1; switch port numbering starts at 0.

---

## Loading HP MIBs

The HP MIB is a set of variables that are private extensions to the Internet standard MIB-II. The MIB-II standard is documented in Request for Comment (RFC) 1213, *Management Information Base for Network Management of TCP/IP-based Internets: MIB-II*. The HP agents support many other Internet-standard MIBs. These standard MIBs are defined in RFC publications. To find specific MIB information, examine the HP MIB structure and the standard RFC MIBs supported by HP.

This section describes the requirements and dependencies when loading MIBs and includes:

- “Before loading MIBs” on page 32
- “MIB loading order” on page 33

### Before loading MIBs

Before loading HP MIB files, ensure that you have the correct version of SNMP for your Fabric OS version (see [Table 2](#)).

**Table 2** Fabric OS supported SNMP versions

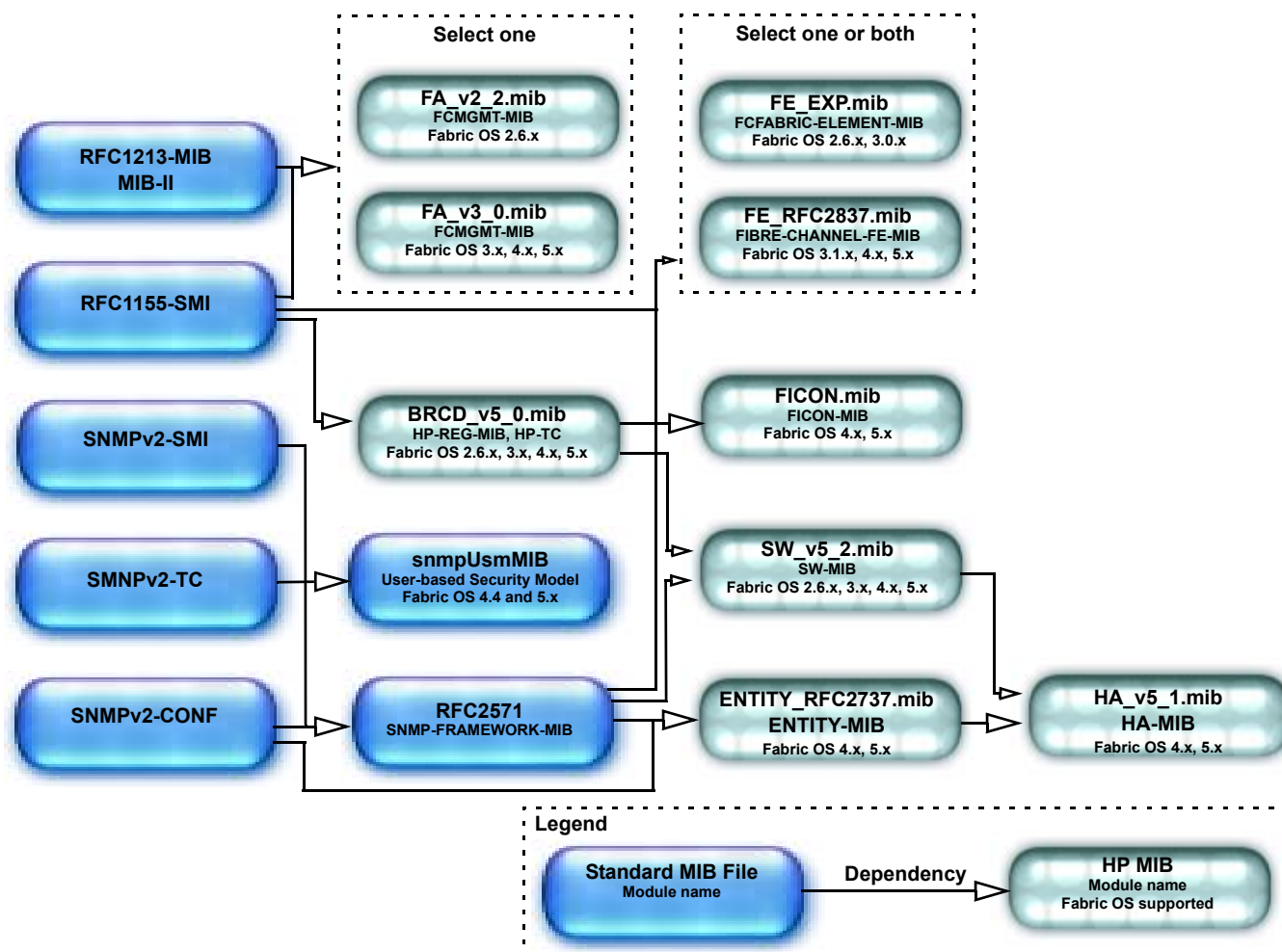
Firmware	SNMPv1	SNMPv2	SNMPv3
Fabric OS 2.6.2 and previous	Yes	Yes <sup>1</sup>	No
Fabric OS 3.2.0 and previous	Yes	Yes <sup>1</sup>	No
Fabric OS 4.2.0 and previous	Yes	No	No
Fabric OS 4.4.0	Yes	Yes <sup>1</sup>	Yes <sup>2</sup>
Fabric OS 5.0	Yes	Yes <sup>1</sup>	Yes <sup>2</sup>

<sup>1</sup> The corresponding Fabric OS has SNMPv2 capabilities, but it is not officially supported by HP.  
<sup>2</sup> Fabric OS 4.4.0 and 5.0 support SNMPv3-USM (snmpUsmMIB) MIB, which is available as RFC 3414.



## MIB loading order

Many MIBs use definitions that are defined in other MIBs. These definitions are listed in the IMPORTS section near the top of the MIB. When loading the HP MIBs, see [Figure 5](#) to ensure any MIB dependencies are loading in the correct order.



**Figure 5** HP SNMP MIB dependencies and advised installation order

**NOTE:** FA\_v3\_0.mib obsoletes the use of the connUnitPortStatFabricTable used in the FA\_v2\_2.mib. FA\_v3\_0.mib now uses the connUnitPortStatTable for port statistics. The FA\_v3\_0.mib and the FA\_v2\_2.mib cannot be loaded concurrently on the same SNMP management system.

The FE\_RFC2837.mib and the FE\_EXP.mib can be loaded concurrently on the same SNMP management system. The FE\_EXP.mib was listed in the experimental OID section. The FE\_RFC2837.mib has subsequently been ratified by the standards organizations.

All versions of Fabric OS support SNMPv1. Fabric 2.6.x and 3.2.x partially support SNMPv2. Fabric OS 4.4.0 and 5.x support SNMPv3-USM (snmpUsmMIB) MIB.

## HP MIB files

The following HP MIBs can be found in a `mibs` subdirectory after uncompressing the 5.x firmware file.

- BRCD\_v5\_0.mib
- SW\_v5\_2.mib

- HA\_v5\_1.mib
- FICON\_v5\_0.mib
- FA\_v3\_0.mib
- ENTITY\_RFC2737.mib
- FE\_RFC2837.mib

## Fabric OS commands for configuring SNMP

Use the commands in [Table 3](#) to configure MIBs in the Fabric OS. See the *HP StorageWorks Fabric OS 5.x administrator guide* for procedures on configuring SNMP on the HP StorageWorks switches.

**Table 3** Commands for configuring SNMP

Command	Description
<code>snmpConfig</code>	Introduced in Fabric OS 4.4, this command has all the features of the existing the <code>agtcfg*</code> commands; in addition, it has SNMPv3 configuration parameters.
<code>snmpMibCapSet</code>	Enhanced in Fabric OS 4.4 to provide a filter facility at the trap level (previously the filter facility was at MIB level for traps).
<code>snmpMibCapShow</code>	Displays the settings in the <code>snmpMibCapSet</code> command.
<code>agtcfgDefault</code>	Resets the traps to the default values. This command is retained for legacy reasons but is replaced functionally by the <code>snmpConfig</code> command.
<code>agtcfgSet</code>	Used to set the trap values for SNMP. This command is retained for legacy reasons but is replaced functionally by the <code>snmpMibCapSet</code> command.
<code>agtcfgShow</code>	Used to display the configuration of the SNMP values. This command is retained for legacy reasons but is replaced functionally by the <code>snmpMibCapShow</code> command.

## Firmware upgrades and enabled traps

Prior to Fabric OS 4.4, traps were turned on and off as a group (for example, the SW-Trap, or FA-Trap). In these versions of Fabric OS it was not possible to set the individual traps (such as `swSensorStatusChangeTrap`, `swTrackChangesTrap`, or `connUnitEventTrap`).

In Fabric OS 4.4 and later, you can turn traps on and off individually within a trap group. The individual traps need to be enabled explicitly after the corresponding trap group is enabled.

Because the pre-Fabric OS 4.4 firmware has only trap group level settings, when you upgrade to the Fabric OS 4.4 or later firmware, individual traps are turned off by default, even if the corresponding trap group was enabled before upgrading. When moving from a downlevel version to Fabric OS 4.4 or later, you must use either the `snmpmibcapset` or the `snmpconfig` command to explicitly turn on the individual traps within each trap group.

## 2 MIB-II (RFC1213-MIB)

This chapter provides descriptions and other information specific to MIB-II, including the following sections:

- [MIB II overview](#) next
- [System group](#), page 41
- [Interfaces group](#), page 42
- [Address translation group](#), page 46
- [IP group](#), page 47
- [ICMP group](#), page 54
- [TCP group](#), page 57
- [UDP group](#), page 60
- [EGP group](#), page 61
- [Transmission group](#), page 61
- [SNMP group](#), page 62

### MIB II overview

The descriptions of each of the MIB variables in this chapter come directly from the MIB-II itself. The notes that follow the descriptions refer to HP-specific information.

### MIB-II object hierarchy

Figure 6 through Figure 15 depicts the organization and structure of MIB-II.

```
- iso (1)
  - org (3)
    - dod (6)
      - internet (1)
        - directory (1)
          - mgmt (2)
            - mib-2 (1)
              - system (1)
              - interfaces (2)
              - at (3)
              - ip (4)
              - icmp (5)
              - tcp (6)
              - udp (7)
              - egp (8)
              - transmission (10)
              - snmp (11)
```

**Figure 6** MIB overall hierarchy

```
- system (1.3.6.1.2.1.1)
  - sysDescr (1)
  - sysObjectID (2)
  - sysUpTime (3)
  - sysContact (4)
  - sysName (5)
  - sysLocation (6)
  - sysServices (7)
```

**Figure 7** System hierarchy

```

- interfaces (1.3.6.1.2.1.2)
  - ifNumber (1)
  - ifTable (2)
    - ifEntry (1)
      - ifIndex (1)
      - ifDescr (2)
      - ifType (3)
      - ifMtu (4)
      - ifSpeed (5)
      - ifPhysAddress (6)
      - ifAdminStatus (7)
      - ifOperStatus (8)
      - ifLastChange (9)
      - ifInOctets (10)
      - ifInUcastPkts (11)
      - ifInNUcastPkts (12)
      - ifInDiscards (13)
      - ifInErrors (14)
      - ifInUnknownProtos (15)
      - ifOutOctets (16)
      - ifOutUcastPkts (17)
      - ifOutNUcastPkts (18)
      - ifOutDiscards (19)
      - ifOutErrors (20)
      - ifOutQLen (21)
      - ifSpecific (22)
      - ifOutUcastPkts (17)
      - ifOutNUcastPkts (18)
      - ifOutDiscards (19)
      - ifOutErrors (20)
      - ifOutQLen (21)
      - ifSpecific (22)

```

**Figure 8** Interfaces hierarchy

```

- at (1.3.6.1.2.1.3)
  - atTable (1)
    - atEntry (1)
      - atIfIndex (1)
      - atPhysAddress (2)
      - atNetAddress (3)

```

**Figure 9** AT hierarchy

```

- ip (1.3.6.1.2.1.4)
  - ipForwarding (1)
  - ipDefaultTTL (2)
  - ipInReceives (3)
  - ipInHdrErrors (4)
  - ipInAddrErrors (5)
  - ipForwDatagrams (6)
  - ipInUnknownProtos (7)
  - ipInDiscards (8)
  - ipInDelivers (9)
  - ipOutRequests (10)
  - ipOutDiscards (11)
  - ipOutNoRoutes (12)
  - ipReasmTimeout (13)
  - ipReasmReqds (14)
  - ipReasmOKs (15)
  - ipReasmFails (16)
  - ipFragOKs (17)
  - ipFragFails (18)
  - ipFragCreates (19)
  - ipAddrTable (20)
    - ipAddrEntry (1)
      - ipAdEntAddr (1)
      - ipAdEntIfIndex (2)
      - ipAdEntNetMask (3)
      - ipAdEntBcastAddr (4)
      - ipAdEntReasmMaxSize (5)
  - ipRouteTable (21)
    - ipRouteEntry (1)
      - ipRouteDest (1)
      - ipRouteIfIndex (2)
      - ipRouteMetric1 (3)
      - ipRouteMetric2 (4)
      - ipRouteMetric3 (5)
      - ipRouteMetric4 (6)
      - ipRouteNextHop (7)
      - ipRouteType (8)
      - ipRouteProto (9)
      - ipRouteAge (10)
      - ipRouteMask (11)
      - ipRouteMetric5 (12)
      - ipRouteInfo (13)
  - ipNetToMediaTable (22)
    - ipNetToMediaEntry (1)
      - ipNetToMediaIfIndex (1)
      - ipNetToMediaPhysAddress (2)
      - ipNetToMediaNetAddress (3)
      - ipNetToMediaType (4)
  - ipRoutingDiscards (23)
    - ipRouteNextHop (7)
    - ipRouteType (8)
    - ipRouteProto (9)
    - ipRouteAge (10)
    - ipRouteMask (11)
    - ipRouteMetric5 (12)
    - ipRouteInfo (13)

```

**Figure 10** IP hierarchy

```

- icmp (1.3.6.1.2.1.5)
  - icmpInMsgs (1)
  - icmpInErrors (2)
  - icmpInDestUnreachs (3)
  - icmpInTimeExcds (4)
  - icmpInParmProbs (5)
  - icmpInSrcQuenchs (6)
  - icmpInRedirects (7)
  - icmpInEchos (8)
  - icmpInEchoReps (9)
  - icmpInTimestamps (10)
  - icmpInTimestampReps (11)
  - icmpInAddrMasks (12)
  - icmpInAddrMaskReps (13)
  - icmpOutMsgs (14)
  - icmpOutErrors (15)
  - icmpOutDestUnreachs (16)
  - icmpOutTimeExcds (17)
  - icmpOutParmProbs (18)
  - icmpOutSrcQuenchs (19)
  - icmpOutRedirects (20)
  - icmpOutEchos (21)
  - icmpOutEchoReps (22)
  - icmpOutTimestamps (23)
  - icmpOutTimestampReps (24)
  - icmpOutAddrMasks (25)
  - icmpOutAddrMaskReps (26)

```

**Figure 11** ICMP hierarchy

```

- tcp (1.3.6.1.2.1.6)
  - tcpRtoAlgorithm (1)
  - tcpRtoMin (2)
  - tcpRtoMax (3)
  - tcpMaxConn (4)
  - tcpActiveOpens (5)
  - tcpPassiveOpens (6)
  - tcpAttemptFails (7)
  - tcpEstabResets (8)
  - tcpCurrEstab (9)
  - tcpInSegs (10)
  - tcpOutSegs (11)
  - tcpRetransSegs (12)
  - tcpConnTable (13)
    - tcpConnEntry (1)
      - tcpConnState (1)
      - tcpConnLocalAddress (2)
      - tcpConnLocalPort (3)
      - tcpConnRemAddress (4)
      - tcpConnRemPort (5)
  - tcpInErrs (14)
  - tcpOutRsts (15)
    - tcpConnLocalAddress (2)
    - tcpConnLocalPort (3)
    - tcpConnRemAddress (4)
    - tcpConnRemPort (5)

```

**Figure 12** TCP hierarchy

```

- udp (1.3.6.1.2.1.7)
  - udpInDatagrams (1)
  - udpNoPorts (2)
  - udpInErrors (3)
  - udpOutDatagrams (4)
  - udpTable (5)
    - udpEntry (1)
      - udpLocalAddress (1)
      - udpLocalPort (2)

```

**Figure 13** UDP hierarchy

```

- egp (1.3.6.1.2.1.8)
  - Transmission group (1)
  - egpInErrors (2)
  - egpOutMsgs (3)
  - egpOutErrors (4)
  - egpNeighTable (5)
    - egpNeighEntry (1)
      - egpNeighState (1)
      - egpNeighAddr (2)
      - egpNeighAs (3)
      - egpNeighInMsgs (4)
      - egpNeighInErrs (5)
      - egpNeighOutMsgs (6)
      - egpNeighOutErrs (7)
      - egpNeighInErrMsgs (8)
      - egpNeighOutErrMsgs (9)
      - egpNeighStateUps (10)
      - egpNeighStateDowns (11)
      - egpNeighIntervalHello (12)
      - egpNeighIntervalPoll (13)
      - egpNeighMode (14)
      - egpNeighEventTrigger (15)
  - egpAs (6)

```

**Figure 14** EGP hierarchy

```

- snmp (1.3.6.1.2.1.11)
  - snmpInPkts (1)
  - snmpOutPkts (2)
  - snmpInBadVersions (3)
  - snmpInBadCommunityNames (4)
  - snmpInBadCommunityUses (5)
  - snmpInASNParseErrs (6)
  - snmpInTooBigs (8)
  - snmpInNoSuchNames (9)
  - snmpInBadValues (10)
  - snmpInReadOnly (11)
  - snmpInGenErrs (12)
  - snmpInTotalReqVars (13)
  - snmpInTotalSetVars (14)
  - snmpInGetRequests (15)
  - snmpInGetNexts (16)
  - snmpInSetRequests (17)
  - snmpInGetResponses (18)
  - snmpInTraps (19)
  - snmpOutTooBigs (20)
  - snmpOutNoSuchNames (21)
  - snmpOutBadValues (22)
  - snmpOutGenErrs (24)
  - snmpOutGetRequests (25)
  - snmpOutGetNexts (26)
  - snmpOutSetRequests (27)
  - snmpOutGetResponses (28)
  - snmpOutTraps (29)
  - snmpEnableAuthenTraps (30)
  - snmpOutBadValues (22)
  - snmpOutGenErrs (24)
  - snmpOutGetRequests (25)
  - snmpOutGetNexts (26)
  - snmpOutSetRequests (27)
  - snmpOutGetResponses (28)
  - snmpOutTraps (29)
  - snmpEnableAuthenTraps (30)

```

**Figure 15** SNMP hierarchy

## Textual conventions

Table 4 lists the textual conventions used for MIB-II.

**Table 4** MIB-II text conventions

Type definition	Value
DisplayString	Octet string of size 0 to 255
PhysAddress	Octet string

## Objects and types imported

The following objects and types are imported from RFC1155-SMI:

- Mgmt
- NetworkAddress
- IpAddress
- Counter
- Gauge
- TimeTicks



## System group

All systems must implement the System Group. If an agent is not configured to have a value for any of the System Group variables, a string of length 0 is returned.

### sysDescr

OID	1.3.6.1.2.1.1.1
Description	A textual description of the entity.
Note	This value should include the full name and version identification of the hardware type, software operating system, and networking software. The value must contain only printable ASCII characters.  Default Value = Fibre Channel Switch. Set this value using the <code>agtCfgSet</code> command.

### sysObjectID

OID	1.3.6.1.2.1.1.2
Description	The vendor's authoritative identification of the network management subsystem contained in the entity.
Note	This value is allocated within the Storage Management Initiative (SMI) enterprises subtree (1.3.6.1.4.1) and provides an easy and unambiguous means for determining what kind of device is being managed.  For example, if a vendor, NetYarn, Inc., was assigned the subtree 1.3.6.1.4.1.4242, it could assign the identifier 1.3.6.1.4.1.4242.1.1 to its Knit Router.  Default value = iso.org.dod.internet.private.enterprises.bcsi.commDev.fibrechannel.fcSwitch.sw

### sysUpTime

OID	1.3.6.1.2.1.1.3
Description	The time (in hundredths of a second) since the network management portion of the system was last reinitialized.

### sysContact

OID	1.3.6.1.2.1.1.4
Description	The textual identification of the contact person for this managed node, together with information on how to contact this person.
Note	Default value = Field Support. Set this value using the <code>agtCfgSet</code> command.

### sysName

OID	1.3.6.1.2.1.1.5
Description	An administratively assigned name for this managed node. By convention, this is the node's fully qualified domain name.
Note	Default value = <i>preassigned name of the switch</i> .

### sysLocation

OID	1.3.6.1.2.1.1.6
Description	The physical location of this node (for example, telephone closet, 3rd floor).
Note	Default value = End User Premise. Set this value using the <code>agtCfgSet</code> command.

## sysServices

OID	1.3.6.1.2.1.1.7
Description	<p>A value that indicates the set of services that this entity primarily offers.</p> <p>The value is a sum. This sum initially takes the value 0. Then, for each layer, L, in the range 1 through 7, for which this node performs transactions, 2 raised to (L - 1) is added to the sum. For example, a node that primarily performs routing functions has a value of 4 (<math>2^{3-1}</math>). In contrast, a node that is a host and offers application services has a value of 72 (<math>2^{4-1} + 2^{7-1}</math>). Note that in the context of the Internet suite of protocols, values should be calculated accordingly:</p> <p>Layer functionality</p> <ul style="list-style-type: none"><li>1 = physical (for example, repeaters)</li><li>2 = datalink/subnetwork (for example, bridges)</li><li>3 = internet (for example, IP gateways)</li><li>4 = end-to-end (for example, IP hosts)</li><li>7 = applications (for example, mail relays)</li></ul>
Note	For systems including OSI protocols, layers 5 and 6 also can be counted. The return value is always 79.

## Interfaces group

Implementation of the Interfaces group is mandatory for all systems.

### ifNumber

OID	1.3.6.1.2.1.2.1
Description	The number of network interfaces (regardless of their current state) present on this system.
Note	The return value is 5 for the SAN Director 2/128 and 4/256 SAN Director (single domain), 7 for the Core Switch 2/64 or the SAN Director 2/128 (dual-domain). All non-bladed systems will have a value of 3.

## Interfaces table

The Interfaces table contains information on the entity's interfaces. Each interface is thought of as being attached to a subnetwork. Note that this term should not be confused with subnet, which refers to an addressing partitioning scheme used in the Internet suite of protocols.

### ifTable

OID	1.3.6.1.2.1.2.2
Description	A list of interface entries. The number of entries is given by the value of ifNumber.

### ifEntry

OID	1.3.6.1.2.1.2.2.1
Description	An interface entry containing objects at the subnetwork layer and below, for a particular interface.
Index	ifIndex

## ifIndex

OID	1.3.6.1.2.1.2.2.1.1
Description	A unique value for each interface.
Note	<p>The values range between 1 and the value of ifNumber. The value for each interface must remain constant, at least from one reinitialization of the entity's network management system to the next reinitialization.</p> <p>For example, the number of entries inside the Core Switch 2/64, SAN Director 2/128, and 4/256 SAN Director is 1, 2, or 3 for FCIP; otherwise, the value is 1 or 2.</p>

## ifDescr

OID	1.3.6.1.2.1.2.2.1.2
Description	A textual string containing information about the interface.
Note	<p>The ifDescr for non-bladed switches includes: lo, eth0, and fc0.</p> <p>The ifDescr for Core Switch 2/64, SAN Director 2/128, and 4/256 SAN Director includes: lo, eth0, and fc0, as well as fc1, eth0:1, and eth0:2.</p>

## ifType

OID	1.3.6.1.2.1.2.2.1.3
Description	The type of interface, designated by the physical/link protocols immediately below the network layer in the protocol stack.
Note	<p>eth0 maps to 6 (Ethernet-csmacd).</p> <p>lo0 maps to 24 (softwareLoopback).</p> <p>fc0 maps to 56.</p>

## ifMtu

OID	1.3.6.1.2.1.2.2.1.4
Description	The size of the largest datagram that can be sent/received on the interface, specified in octets.
Note	<p>For interfaces that are used to transmit network datagrams, the value is the size of the largest network datagram that can be sent on the interface (these values are different for Fabric OS 4.x).</p> <p>fei0 returns 1500.</p> <p>lo0 returns 3904.</p> <p>fc0 returns 2024.</p>

## ifSpeed

OID	1.3.6.1.2.1.2.2.1.5
Description	An estimate (in bits per second) of the interface's current bandwidth.
Note	For interfaces that do not vary in bandwidth or interfaces for which no accurate estimation can be made, this object should contain the nominal bandwidth. For Fabric OS 4.x, 2 Gbit/sec returns. fei0 returns $10^7$ . lo0 returns 0. fc0 returns $10^9$ .

## ifPhysAddress

OID	1.3.6.1.2.1.2.2.1.6
Description	The interface's address at the protocol layer immediately below the network layer in the protocol stack.
Note	For interfaces that do not have such an address (for example, a serial line), this object should contain an octet string of zero length. fei0 returns MAC address of the Ethernet. lo0 returns null. fc0 returns MAC address of the Fibre Channel.

## ifAdminStatus

OID	1.3.6.1.2.1.2.2.1.7
Description	The desired state of the interface.
Note	The 3 state (testing) indicates that no operational packets can be passed. This object is read-only in Fabric OS 4.x.

## ifOperStatus

OID	1.3.6.1.2.1.2.2.1.8
Description	The current operational state of the interface.
Note	The 3 state (testing) indicates that no operational packets can be passed.

## ifLastChange

OID	1.3.6.1.2.1.2.2.1.9
Description	The value of sysUpTime at the time the interface entered its current operational state. If the current state was entered prior to the last reinitialization of the local network management subsystem, then this object contains a zero value.

## ifInOctets

OID	1.3.6.1.2.1.2.2.1.10
Description	The total number of octets received on the interface, including framing characters.

### ifInUcastPkts

OID	1.3.6.1.2.1.2.2.1.11
Description	The number of subnetwork-unicast packets delivered to a higher-layer protocol.

### ifInNUcastPkts

OID	1.3.6.1.2.1.2.2.1.12
Description	The number of nonunicast packets (for example, subnetwork-broadcast or subnetwork-multicast) delivered to a higher-layer protocol.

### ifInDiscards

OID	1.3.6.1.2.1.2.2.1.13
Description	The number of inbound packets that were chosen to be discarded (even though no errors had been detected) to prevent their being deliverable to a higher-layer protocol.
Note	One possible reason for discarding such a packet could be to free buffer space.

### ifInErrors

OID	1.3.6.1.2.1.2.2.1.14
Description	The number of inbound packets that contained errors, which thereby prevented them from being deliverable to a higher-layer protocol.

### ifInUnknownProtos

OID	1.3.6.1.2.1.2.2.1.15
Description	The number of packets received by way of the interface that were discarded because of an unknown or unsupported protocol.

### ifOutOctets

OID	1.3.6.1.2.1.2.2.1.16
Description	The total number of octets transmitted out of the interface, including framing characters.

### ifOutUcastPkts

OID	1.3.6.1.2.1.2.2.1.17
Description	The total number of packets that were requested, by higher-level protocols, to be transmitted to a subnetwork-unicast address, including those that were discarded or not sent.

### ifOutNUcastPkts

OID	1.3.6.1.2.1.2.2.1.18
Description	The total number of packets that were requested, by higher-level protocols, to be transmitted to a nonunicast address (for example, a subnetwork-broadcast or subnetwork-multicast), including those that were discarded or not sent.

## ifOutDiscards

OID	1.3.6.1.2.1.2.2.1.19
Description	The number of outbound packets that were chosen to be discarded (even though no errors had been detected) to prevent their being transmitted. One possible reason for discarding such a packet could be to free buffer space.

## ifOutErrors

OID	1.3.6.1.2.1.2.2.1.20
Description	The number of outbound packets that could not be transmitted because of errors.

## ifOutQLen

OID	1.3.6.1.2.1.2.2.1.21
Description	The length of the output packet queue (in packets).

## ifSpecific

OID	1.3.6.1.2.1.2.2.1.22
Description	<p>A reference to MIB definitions specific to the particular media being used to realize the interface.</p> <p>For example, if the interface is realized by an Ethernet, then the value of this object refers to a document defining objects specific to Ethernet. If this information is not present, its value should be set to the OID 0 0, which is a syntactically valid OID, and any conformant implementation of ASN.1 and BER must be able to generate and recognize this value.</p>
Note	<p>fei0 returns null OID.</p> <p>lo0 returns null OID.</p> <p>fc0 returns null OID.</p>

## Address translation group

Implementation of the Address Translation group is mandatory for all systems. Note, however, that this group is deprecated by MIB-II. From MIB-II onward, each network protocol group contains its own address translation tables.

## Address translation table

The Address Translation group contains one table, which is the union across all interfaces of the translation tables for converting a network address (for example, an IP address) into a subnetwork-specific address. For lack of a better term, this document refers to such a subnetwork-specific address as a *physical address*.

For example, for broadcast media, where ARP is in use, the translation table is equivalent to the ARP cache; on an X.25 network, where nonalgorithmic translation to X.121 addresses is required, the translation table contains the network address to X.121 address equivalences.

## atTable

OID	1.3.6.1.2.1.3.1
Description	The Address Translation tables contain the network address to physical address equivalences. Some interfaces do not use translation tables for determining address equivalences (for example, DDN-X.25 has an algorithmic method); if all interfaces are of this type, then the Address Translation table is empty.

## atEntry

OID	1.3.6.1.2.1.3.1.1
Description	Each entry contains one network address to physical address equivalence.
Index	atIfIndex, atNetAddress

## atIfIndex

OID	1.3.6.1.2.1.3.1.1.1
Description	The interface on which this entry's equivalence is effective. The interface identified by a particular value of this index is the same interface as identified by the same value of ifIndex.

## atPhysAddress

OID	1.3.6.1.2.1.3.1.1.2
Description	The media-dependent physical address.

## atNetAddress

OID	1.3.6.1.2.1.3.1.1.3
Description	The network address (for example, the IP address) corresponding to the media-dependent physical address.

## IP group

Implementation of the IP group is mandatory for all systems.

## ipForwarding

OID	1.3.6.1.2.1.4.1
Description	The indication of whether this entity is acting as an IP gateway in respect to the forwarding of datagrams received by, but not addressed to, this entity. IP gateways forward datagrams; IP hosts do not (except those source-routed through the host).

## ipDefaultTTL

OID	1.3.6.1.2.1.4.2
Description	The default value inserted into the time-to-live field of the IP header of datagrams originated at this entity, whenever a TTL value is not supplied by the transport layer protocol.

## ipInReceives

OID	1.3.6.1.2.1.4.3
Description	The total number of input datagrams received from interfaces, including those received in error.

## ipInHdrErrors

OID	1.3.6.1.2.1.4.4
Description	The number of input datagrams discarded due to errors in their IP headers, including bad checksums, version number mismatch, other format errors, time-to-live exceeded, errors discovered in processing their IP options, and so forth.

## ipInAddrErrors

OID	1.3.6.1.2.1.4.5
Description	The number of input datagrams discarded because the IP address in their IP header's destination field was not a valid address to be received at this entity. This count includes invalid addresses (for example, 0.0.0.0) and addresses of unsupported classes (for example, Class E). For entities that are not IP gateways and therefore do not forward datagrams, this counter includes datagrams discarded because the destination address was not a local address.

## ipForwDatagrams

OID	1.3.6.1.2.1.4.6
Description	The number of input datagrams for which this entity was not final IP destination, as a result of which an attempt was made to find a route to forward them to that final destination. In entities that do not act as IP gateways, this counter includes only those packets that were source-routed through this entity, and the Source-Route option processing was successful.

## ipInUnknownProtos

OID	1.3.6.1.2.1.4.7
Description	The number of locally addressed datagrams received successfully but discarded because of an unknown or unsupported protocol.

## ipInDiscards

OID	1.3.6.1.2.1.4.8
Description	The number of input IP datagrams for which no problems were encountered to prevent their continued processing, but which were discarded (for example, for lack of buffer space).
Note	This counter does not include any datagrams discarded while awaiting reassembly.

## ipInDelivers

OID	1.3.6.1.2.1.4.9
Description	The total number of input datagrams successfully delivered to IP user protocols (including ICMP).

## ipOutRequests

OID	1.3.6.1.2.1.4.10
Description	The total number of IP datagrams that local IP user protocols (including ICMP) supplied to IP in requests for transmission. Note that this counter does not include any datagrams counted in ipForwDatagrams.

## ipOutDiscards

OID	1.3.6.1.2.1.4.11
Description	The number of output IP datagrams for which no problem was encountered to prevent their transmission to their destination, but which were discarded (for example, for lack of buffer space).



Note	This counter would include datagrams counted in ipForwDatagrams if any such packets met this (discretionary) discard criterion.
------	---

### ipOutNoRoutes

OID	1.3.6.1.2.1.4.12
Description	The number of IP datagrams discarded because no route could be found to transmit them to their destination.
Note	This counter includes any packets counted in ipForwDatagrams that meet this no-route criterion. Note that this includes any datagrams that a host cannot route because all of its default gateways are down.

### ipReasmTimeout

OID	1.3.6.1.2.1.4.13
Description	The maximum number of seconds that received fragments are held while they are awaiting reassembly at this entity.

### ipReasmReqds

OID	1.3.6.1.2.1.4.14
Description	The number of IP fragments received that needed to be reassembled at this entity.

### ipReasmOKs

OID	1.3.6.1.2.1.4.15
Description	The number of IP datagrams successfully reassembled.

### ipReasmFails

OID	1.3.6.1.2.1.4.16
Description	The number of failures detected by the IP reassembly algorithm (for whatever reason: timed out, errors, and so forth).
Note	This is not necessarily a count of discarded IP fragments, because some algorithms (notably the algorithm in RFC 815) can lose track of the number of fragments by combining them as they are received.

### ipFragOKs

OID	1.3.6.1.2.1.4.17
Description	The number of IP datagrams that have been successfully fragmented at this entity.

### ipFragFails

OID	1.3.6.1.2.1.4.18
Description	The number of IP datagrams that have been discarded because they needed to be fragmented at this entity but could not be (for example, because their Don't Fragment flag was set).

## ipFragCreates

OID	1.3.6.1.2.1.4.19
Description	The number of IP datagram fragments that have been generated as a result of fragmentation at this entity.

## IP address table

The IP address table contains this entity's IP addressing information.

### ipAddrTable

OID	1.3.6.1.2.1.4.20
Description	The table of addressing information relevant to this entity's IP addresses.

### ipAddrEntry

OID	1.3.6.1.2.1.4.20.1
Description	The addressing information for one of this entity's IP addresses.
Index	ipAdEntAddr

### ipAdEntAddr

OID	1.3.6.1.2.1.4.20.1.1
Description	The IP address to which this entry's addressing information pertains.

### ipAdEntIfIndex

OID	1.3.6.1.2.1.4.20.1.2
Description	The index value that uniquely identifies the interface to which this entry is applicable. The interface identified by a particular value of this index is the same interface as identified by the same value of ifIndex.

### ipAdEntNetMask

OID	1.3.6.1.2.1.4.20.1.3
Description	The subnet mask associated with the IP address of this entry. The value of the mask is an IP address with all the network bits set to 1 and all the host bits set to 0.

### ipAdEntBcastAddr

OID	1.3.6.1.2.1.4.20.1.4
Description	The value of the least-significant bit in the IP broadcast address used for sending datagrams on the (logical) interface associated with the IP address of this entry. For example, when the Internet standard all-ones broadcast address is used, the value will be 1. This value applies to both the subnet and network broadcasts addresses used by the entity on this (logical) interface.

### ipAdEntReasmMaxSize

OID	1.3.6.1.2.1.4.20.1.5
Description	The size of the largest IP datagram that this entity can reassemble from incoming IP fragmented datagrams received on this interface.

## IP routing table

The IP routing table contains an entry for each route currently known to this entity.

### ipRouteTable

OID	1.3.6.1.2.1.4.21
Description	This entity's IP routing table.

### ipRouteEntry

OID	1.3.6.1.2.1.4.21.1
Description	A route to a particular destination.
Index	ipRouteDest

### ipRouteDest

OID	1.3.6.1.2.1.4.21.1.1
Description	The destination IP address of this route.
Note	An entry with a value of 0.0.0.0 is considered a default route. Multiple routes to a single destination can appear in the table, but access to such multiple entries is dependent on the table-access mechanisms defined by the network management protocol in use.

### ipRouteIfIndex

OID	1.3.6.1.2.1.4.21.1.2
Description	The index value that uniquely identifies the local interface through which the next hop of this route should be reached.
Note	The interface identified by a particular value of this index is the same interface identified by the same value of ifIndex.

### ipRouteMetric1

OID	1.3.6.1.2.1.4.21.1.3
Description	The primary routing metric for this route.
Note	The semantics of this metric are determined by the routing protocol specified in the route's ipRouteProto value. If this metric is not used, its value should be set to -1.

### ipRouteMetric2

OID	1.3.6.1.2.1.4.21.1.4
Description	An alternate routing metric for this route.
Note	The semantics of this metric are determined by the routing protocol specified in the route's ipRouteProto value. If this metric is not used, its value should be set to -1.

### ipRouteMetric3

OID	1.3.6.1.2.1.4.21.1.5
Description	An alternate routing metric for this route.

Note	The semantics of this metric are determined by the routing protocol specified in the route's ipRouteProto value. If this metric is not used, its value should be set to -1.
------	---

## ipRouteMetric4

OID	1.3.6.1.2.1.4.21.1.6
Description	An alternate routing metric for this route.
Note	The semantics of this metric are determined by the routing protocol specified in the route's ipRouteProto value. If this metric is not used, its value should be set to -1.

## ipRouteNextHop

OID	1.3.6.1.2.1.4.21.1.7
Description	The IP address of the next hop of this route. (In the case of a route bound to an interface that is realized via a broadcast media, the value of this field is the agent's IP address on that interface.)

## ipRouteType

OID	1.3.6.1.2.1.4.21.1.8
Description	<p>The type of route. Valid values are:</p> <p>other (1) None of the following</p> <p>invalid (2) An invalidated route—route to directly</p> <p>direct (3) Connected (sub)network—route to a non-local</p> <p>indirect (4) Host/network/subnetwork</p> <p>Setting this object to 2 (invalid) has the effect of invalidating the corresponding entry in the ipRouteTable object. That is, it effectively disassociates the destination identified with said entry from the route identified with said entry. It is an implementation-specific matter as to whether the agent removes an invalidated entry from the table. Accordingly, management stations must be prepared to receive tabular information from agents that corresponds to entries not currently in use. Proper interpretation of such entries requires examination of the relevant ipRouteType object.</p>
Note	The values direct (3) and indirect (4) refer to the notion of direct and indirect routing in the IP architecture.

## ipRouteProto

OID	1.3.6.1.2.1.4.21.1.9
Description	The routing mechanism via which this route was learned.
Note	Inclusion of values for gateway routing protocols is not intended to imply that hosts should support those protocols.

## ipRouteAge

OID	1.3.6.1.2.1.4.21.1.10
Description	The number of seconds since this route was last updated or otherwise determined to be correct.
Note	Older semantics cannot be implied except through knowledge of the routing protocol by which the route was learned.

## ipRouteMask

OID	1.3.6.1.2.1.4.21.1.11								
Description	The mask to be logical-ANDed with the destination address before being compared to the value in the ipRouteDest field. For those systems that do not support arbitrary subnet masks, an agent constructs the value of the ipRouteMask by determining whether the value of the correspondent ipRouteDest field belong to a class-A, B, or C network, and then using one of the following: <table><thead><tr><th>mask</th><th>network</th></tr></thead><tbody><tr><td>255.0.0.0</td><td>class-A</td></tr><tr><td>255.255.0.0</td><td>class-B</td></tr><tr><td>255.255.255.0</td><td>class-C</td></tr></tbody></table> If the value of the ipRouteDest is 0.0.0.0 (default route), then the mask value is also 0.0.0.0.	mask	network	255.0.0.0	class-A	255.255.0.0	class-B	255.255.255.0	class-C
mask	network								
255.0.0.0	class-A								
255.255.0.0	class-B								
255.255.255.0	class-C								
Note	All IP routing subsystems implicitly use this mechanism.								

## ipRouteMetric5

OID	1.3.6.1.2.1.4.21.1.12
Description	An alternate routing metric for this route.
Note	The semantics of this metric are determined by the routing protocol specified in the route's ipRouteProto value. If this metric is not used, its value should be set to -1.

## ipRouteInfo

OID	1.3.6.1.2.1.4.21.1.13
Description	A reference to MIB definitions specific to the particular routing protocol that is responsible for this route, as determined by the value specified in the route's ipRouteProto value. If this information is not present, its value should be set to the OID { 0 0 }, which is a syntactically valid OID; any conformant implementation of ASN.1 and BER must be able to generate and recognize this value.

## IP address translation table

The IP address translation table contains the IpAddress to physical address equivalences. Some interfaces do not use translation tables for determining address equivalences. For example:

DDN-X.25 has an algorithmic method; if all interfaces are of this type, then the Address Translation table is empty.

## ipNetToMediaTable

OID	1.3.6.1.2.1.4.22
Description	The IP Address Translation table used for mapping from IP addresses to physical addresses.

## ipNetToMediaEntry

OID	1.3.6.1.2.1.4.22.1
Description	Each entry contains one IpAddress to physical address equivalence.
Index	ipNetToMediaIfIndex, ipNetToMediaNetAddress

## ipNetToMediaIfIndex

OID	1.3.6.1.2.1.4.22.1.1
Description	The interface on which this entry's equivalence is effective.
Note	The interface identified by a particular value of this index is the same interface identified by the same value of ifIndex.

## ipNetToMediaPhysAddress

OID	1.3.6.1.2.1.4.22.1.2
Description	The media-dependent physical address.

## ipNetToMediaNetAddress

OID	1.3.6.1.2.1.4.22.1.3
Description	The IpAddress corresponding to the media-dependent physical address.

## ipNetToMediaType

OID	1.3.6.1.2.1.4.22.1.4
Description	The type of mapping.

## Additional IP objects

### ipRoutingDiscards

OID	1.3.6.1.2.1.4.23
Description	The number of routing entries discarded even though they are valid. One possible reason for discarding such an entry could be to free buffer space for other routing entries.

## ICMP group

Implementation of the ICMP group is mandatory for all systems.

### icmplnMsgs

OID	1.3.6.1.2.1.5.1
Description	The total number of ICMP messages that the entity received.
Note	This counter includes all ICMP messages counted by icmplnErrors.

### icmplnErrors

OID	1.3.6.1.2.1.5.2
Description	The number of ICMP messages that the entity received but determined to have ICMP-specific errors (bad ICMP checksums, bad length, and so forth).

### icmplnDestUnreachs

OID	1.3.6.1.2.1.5.3
Description	The number of ICMP Destination Unreachable messages received.

### icmplnTimeExcds

OID	1.3.6.1.2.1.5.4
Description	The number of ICMP Time Exceeded messages received.

### icmplnParmProbs

OID	1.3.6.1.2.1.5.5
Description	The number of ICMP Parameter Problem messages received.

### icmplnSrcQuenchs

OID	1.3.6.1.2.1.5.6
Description	The number of ICMP Source Quench messages received.

### icmplnRedirects

OID	1.3.6.1.2.1.5.7
Description	The number of ICMP Redirect messages received.

### icmplnEchos

OID	1.3.6.1.2.1.5.8
Description	The number of ICMP Echo (request) messages received.

### icmplnEchoReps

OID	1.3.6.1.2.1.5.9
Description	The number of ICMP Echo Reply messages received.

### icmplnTimestamps

OID	1.3.6.1.2.1.5.10
Description	The number of ICMP Timestamp (request) messages received.

### icmplnTimestampReps

OID	1.3.6.1.2.1.5.11
Description	The number of ICMP Timestamp Reply messages received.

### icmplnAddrMasks

OID	1.3.6.1.2.1.5.12
Description	The number of ICMP Address Mask Request messages received.

### icmplnAddrMaskReps

OID	1.3.6.1.2.1.5.13
Description	The number of ICMP Address Mask Reply messages received.

## icmpOutMsgs

OID	1.3.6.1.2.1.5.14
Description	The total number of ICMP messages that this entity attempted to send.
Note	This counter includes all those counted by icmpOutErrors.

## icmpOutErrors

OID	1.3.6.1.2.1.5.15
Description	The number of ICMP messages that this entity did not send due to problems discovered within ICMP, such as a lack of buffers. This value should not include errors discovered outside the ICMP layer, such as the inability of IP to route the resultant datagram. In some implementations there might be no types of error that contribute to this counter's value.

## icmpOutDestUnreachs

OID	1.3.6.1.2.1.5.16
Description	The number of ICMP Destination Unreachable messages sent.

## icmpOutTimeExcds

OID	1.3.6.1.2.1.5.17
Description	The number of ICMP Time Exceeded messages sent.

## icmpOutParmProbs

OID	1.3.6.1.2.1.5.18
Description	The number of ICMP Parameter Problem messages sent.

## icmpOutSrcQuenches

OID	1.3.6.1.2.1.5.19
Description	The number of ICMP Source Quench messages sent.

## icmpOutRedirects

OID	1.3.6.1.2.1.5.20
Description	The number of ICMP Redirect messages sent. For a host, this object is always 0, since hosts do not send redirects.

## icmpOutEchos

OID	1.3.6.1.2.1.5.21
Description	The number of ICMP Echo (request) messages sent.

## icmpOutEchoReps

OID	1.3.6.1.2.1.5.22
Description	The number of ICMP Echo Reply messages sent.



## icmpOutTimestamps

OID	1.3.6.1.2.1.5.23
Description	The number of ICMP Timestamp (request) messages sent.

## icmpOutTimestampReps

OID	1.3.6.1.2.1.5.24
Description	The number of ICMP Timestamp Reply messages sent.

## icmpOutAddrMasks

OID	1.3.6.1.2.1.5.25
Description	The number of ICMP Address Mask Request messages sent.

## icmpOutAddrMaskReps

OID	1.3.6.1.2.1.5.26
Description	The number of ICMP Address Mask Reply messages sent.

## TCP group

Implementation of the TCP group is mandatory for all systems that implement the TCP.

Instances of object types that represent information about a particular TCP connection are transient; they persist only as long as the connection in question.

## tcpRtoAlgorithm

OID	1.3.6.1.2.1.6.1
Description	The algorithm used to determine the time-out value used for retransmitting unacknowledged octets.

## tcpRtoMin

OID	1.3.6.1.2.1.6.2
Description	The minimum value permitted by a TCP implementation for the retransmission time-out, measured in milliseconds.
Note	More refined semantics for objects of this type depend upon the algorithm used to determine the retransmission time-out. In particular, when the time-out algorithm is 3 (rsre), an object of this type has the semantics of the LBOUND quantity described in RFC 793.

## tcpRtoMax

OID	1.3.6.1.2.1.6.3
Description	The maximum value permitted by a TCP implementation for the retransmission time-out, measured in milliseconds.
Note	More refined semantics for objects of this type depend upon the algorithm used to determine the retransmission time-out. In particular, when the time-out algorithm is 3 (rsre), an object of this type has the semantics of the UBOUND quantity described in RFC 793.

## tcpMaxConn

OID	1.3.6.1.2.1.6.4
Description	The limit on the total number of TCP connections the entity can support. In entities where the maximum number of connections is dynamic, this object should contain the value -1.

## tcpActiveOpens

OID	1.3.6.1.2.1.6.5
Description	The number of times TCP connections have made a direct transition to the SYN-SENT state from the CLOSED state.

## tcpPassiveOpens

OID	1.3.6.1.2.1.6.6
Description	The number of times TCP connections have made a direct transition to the SYN-RCVD state from the LISTEN state.

## tcpAttemptFails

OID	1.3.6.1.2.1.6.7
Description	The number of times TCP connections have made a direct transition to the CLOSED state from either the SYN-SENT state or the SYN-RCVD state, plus the number of times TCP connections have made a direct transition to the LISTEN state from the SYN-RCVD state.

## tcpEstabResets

OID	1.3.6.1.2.1.6.8
Description	The number of times TCP connections have made a direct transition to the CLOSED state from either the ESTABLISHED state or the CLOSE-WAIT state.

## tcpCurrEstab

OID	1.3.6.1.2.1.6.9
Description	The number of TCP connections for which the current state is either ESTABLISHED or CLOSE-WAIT.

## tcpInSegs

OID	1.3.6.1.2.1.6.10
Description	The total number of segments received, including those received in error. This count includes segments received on currently established connections.

## tcpOutSegs

OID	1.3.6.1.2.1.6.11
Description	The total number of segments sent, including those on current connections but excluding those containing only retransmitted octets.

## tcpRetransSegs

OID	1.3.6.1.2.1.6.12
Description	The total number of segments retransmitted; that is, the number of TCP segments transmitted containing one or more previously transmitted octets.

## TCP connection table

The TCP connection table contains information about this entity's existing TCP connections.

### tcpConnTable

OID	1.3.6.1.2.1.6.13
Description	A table containing TCP connection-specific information.

### tcpConnEntry

OID	1.3.6.1.2.1.6.13.1
Description	Information about a particular current TCP connection. An object of this type is transient, in that it ceases to exist when (or soon after) the connection makes the transition to the CLOSED state.
Index	tcpConnLocalAddress, tcpConnLocalPort, tcpConnRemAddress, tcpConnRemPort

### tcpConnState

OID	1.3.6.1.2.1.6.13.1.1
Description	<p>The state of this TCP connection.</p> <p>The only value that might be set by a management station is deleteTCB (12). Accordingly, it is appropriate for an agent to return a badValue response if a management station attempts to set this object to any other value.</p> <p>If a management station sets this object to the value deleteTCB (12), then this has the effect of deleting the TCB (as defined in RFC 793) of the corresponding connection on the managed node, resulting in immediate termination of the connection.</p> <p>As an implementation-specific option, a RST segment might be sent from the managed node to the other TCP endpoint (note, however, that RST segments are not sent reliably).</p> <p>Possible values are:</p> <ul style="list-style-type: none"><li>• closed (1)</li><li>• listen (2)</li><li>• synSent (3)</li><li>• synReceived (4)</li><li>• established (5)</li><li>• finWait1 (6)</li><li>• finWait2 (7)</li><li>• closeWait (8)</li><li>• lastAck (9)</li><li>• closing (10)</li><li>• timeWait (11)</li><li>• deleteTCB (12)</li></ul>
Note	Fabric OS 3.1.x and 4.x do not allow the SET operation on this variable.

### tcpConnLocalAddress

OID	1.3.6.1.2.1.6.13.1.2
Description	The local IP address for this TCP connection. In the case of a connection in the listen state that is willing to accept connections for any IP interface associated with the node, the value 0.0.0.0 is used.

### tcpConnLocalPort

OID	1.3.6.1.2.1.6.13.1.3
Description	The local port number for this TCP connection.

### tcpConnRemAddress

OID	1.3.6.1.2.1.6.13.1.4
Description	The remote IP address for this TCP connection.

### tcpConnRemPort

OID	1.3.6.1.2.1.6.13.1.5
Description	The remote port number for this TCP connection.

## Additional TCP objects

### tcpInErrs

OID	1.3.6.1.2.1.6.14
Description	The total number of segments received in error (for example, bad TCP checksums).

### tcpOutRsts

OID	1.3.6.1.2.1.6.15
Description	The number of TCP segments sent containing the RST flag.

## UDP group

Implementation of the UDP group is mandatory for all systems that implement the UDP.

### udpInDatagrams

OID	1.3.6.1.2.1.7.1
Description	The total number of UDP datagrams delivered to UDP users.

### udpNoPorts

OID	1.3.6.1.2.1.7.2
Description	The total number of received UDP datagrams for which there was no application at the destination port.

### udpInErrors

OID	1.3.6.1.2.1.7.3
Description	The number of received UDP datagrams that could not be delivered for reasons other than the lack of an application at the destination port.

### udpOutDatagrams

OID	1.3.6.1.2.1.7.4
Description	The total number of UDP datagrams sent from this entity.

## UDP listener table

The UDP listener table contains information about this entity's UDP end-points on which a local application is currently accepting datagrams.

### udpTable

OID	1.3.6.1.2.1.7.5
Description	A table containing UDP listener information.

### udpEntry

OID	1.3.6.1.2.1.7.5.1
Description	Information about a particular current UDP listener.
Index	udpLocalAddress, udpLocalPort

### udpLocalAddress

OID	1.3.6.1.2.1.7.5.1.1
Description	The local IP address for this UDP listener. In the case of a UDP listener that is willing to accept datagrams for any IP interface associated with the node, the value 0.0.0.0 is used.


### udpLocalPort

OID	1.3.6.1.2.1.7.5.1.2
Description	The local port number for this UDP listener.

## EGP group

Implementation of the EGP group is mandatory for all systems that implement the EGP.

---

 **NOTE:** HP does not support the EGP Group; this section is not applicable. See the RFC1213 for complete information regarding the EGP Group.

---

## Transmission group

Based on the transmission media underlying each interface on a system, the corresponding portion of the Transmission group is mandatory for that system.

When Internet-standard definitions for managing transmission media are defined, the transmission group is used to provide a prefix for the names of those objects.

Typically, such definitions reside in the experimental portion of the MIB until they are proven; then, as a part of the Internet standardization process, the definitions are accordingly elevated and a new OID under the transmission group is defined. By convention, the name assigned is

```
type Object Identifier ::= { transmission number }
```

where *type* is the symbolic value used for the media in the *ifType* column of the *ifTable* object, and *transmission number* is the actual integer value corresponding to the symbol.

## SNMP group

Implementation of the SNMP group is mandatory for all systems that support an SNMP protocol entity. Some of the objects defined next are zero-valued in those SNMP implementations that are optimized to support only those functions specific to either a management agent or a management station. All of the objects that follow refer to an SNMP entity. There might be several SNMP entities residing on a managed node (for example, if the node is acting as a management station).

### snmplnPks

OID	1.3.6.1.2.1.11.1
Description	The total number of messages delivered to the SNMP entity from the transport service.

### snmpOutPkts

OID	1.3.6.1.2.1.11.2
Description	The total number of SNMP messages that were passed from the SNMP protocol entity to the transport service.

### snmplnBadVersions

OID	1.3.6.1.2.1.11.3
Description	The total number of SNMP messages that were delivered to the SNMP protocol entity and were for an unsupported SNMP version.

### snmplnBadCommunityNames

OID	1.3.6.1.2.1.11.4
Description	The total number of SNMP messages delivered to the SNMP protocol entity that used a SNMP community name not known to said entity.


### snmplnBadCommunityUses

OID	1.3.6.1.2.1.11.5
Description	The total number of SNMP messages delivered to the SNMP protocol entity that represented an SNMP operation that was not allowed by the SNMP community named in the message.

### snmplnASNParseErrs

OID	1.3.6.1.2.1.11.6
Description	The total number of ASN.1 or BER errors encountered by the SNMP protocol entity when decoding received SNMP messages.

---

 **NOTE:** OID 1.3.6.1.2.1.11.7 is not used.

---

### snmplnTooBigs

OID	1.3.6.1.2.1.11.8
Description	The total number of SNMP power distribution units (PDUs) that were delivered to the SNMP protocol entity and for which the value of the error-status field is <code>tooBig</code> .

### snmplnNoSuchNames

OID	1.3.6.1.2.1.11.9
Description	The total number of SNMP PDUs that were delivered to the SNMP protocol entity and for which the value of the error-status field is <code>noSuchName</code> .

### snmplnBadValues

OID	1.3.6.1.2.1.11.10
Description	The total number of SNMP PDUs that were delivered to the SNMP protocol entity and for which the value of the error-status field is <code>badValue</code> .

### snmplnReadOnly

OID	1.3.6.1.2.1.11.11
Description	The total number valid SNMP PDUs that were delivered to the SNMP protocol entity and for which the value of the error-status field is <code>readOnly</code> .
Note	It is a protocol error to generate an SNMP PDU that contains the value <code>readOnly</code> in the error-status field; as such, this object is provided as a means of detecting incorrect implementations of the SNMP.

### snmplnGenErrs

OID	1.3.6.1.2.1.11.12
Description	The total number of SNMP PDUs that were delivered to the SNMP protocol entity and for which the value of the error-status field is <code>genErr</code> .

### snmplnTotalReqVars

OID	1.3.6.1.2.1.11.13
Description	The total number of MIB objects that have been retrieved successfully by the SNMP protocol entity as the result of receiving valid SNMP Get-Request and Get-Next PDUs.

### snmplnTotalSetVars

OID	1.3.6.1.2.1.11.14
Description	The total number of MIB objects that have been altered successfully by the SNMP protocol entity as the result of receiving valid SNMP Set-Request PDUs.

### snmplnGetRequests

OID	1.3.6.1.2.1.11.15
Status	Mandatory
Description	The total number of SNMP Get-Request PDUs that have been accepted and processed by the SNMP protocol entity.

### snmplnGetNexts

OID	1.3.6.1.2.1.11.16
Description	The total number of SNMP Get-Next PDUs that have been accepted and processed by the SNMP protocol entity.

### snmplnSetRequests

OID	1.3.6.1.2.1.11.17
Description	The total number of SNMP Set-Request PDUs that have been accepted and processed by the SNMP protocol entity.

### snmplnGetResponses

OID	1.3.6.1.2.1.11.18
Description	The total number of SNMP Get-Response PDUs that have been accepted and processed by the SNMP protocol entity.

### snmplnTraps

OID	1.3.6.1.2.1.11.19
Description	The total number of SNMP Trap PDUs that have been accepted and processed by the SNMP protocol entity.

### snmpOutTooBig

OID	1.3.6.1.2.1.11.20
Description	The total number of SNMP PDUs that were generated by the SNMP protocol entity and for which the value of the error-status field is too large.


### snmpOutNoSuchNames

OID	1.3.6.1.2.1.11.21
Description	The total number of SNMP PDUs that were generated by the SNMP protocol entity and for which the value of the error-status field is <code>noSuchName</code> .

### snmpOutBadValues

OID	1.3.6.1.2.1.11.22
Description	The total number of SNMP PDUs that were generated by the SNMP protocol entity and for which the value of the error-status field is <code>badValue</code> .

---

 **NOTE:** OID 1.3.6.1.2.1.11.23 is not used.

---

### snmpOutGenErrs

OID	1.3.6.1.2.1.11.24
Description	The total number of SNMP PDUs that were generated by the SNMP protocol entity and for which the value of the error-status field is <code>genErr</code> .



### snmpOutGetRequests

OID	1.3.6.1.2.1.11.25
Description	The total number of SNMP Get-Request PDUs that have been generated by the SNMP protocol entity.

### snmpOutGetNexts

OID	1.3.6.1.2.1.11.26
Description	The total number of SNMP Get-Next PDUs that have been generated by the SNMP protocol entity.

### snmpOutSetRequests

OID	1.3.6.1.2.1.11.27
Description	The total number of SNMP Set-Request PDUs that have been generated by the SNMP protocol entity.

### snmpOutGetResponses

OID	1.3.6.1.2.1.11.28
Description	The total number of SNMP Get-Response PDUs that have been generated by the SNMP protocol entity.

### snmpOutTraps

OID	1.3.6.1.2.1.11.29
Description	The total number of SNMP Trap PDUs that have been generated by the SNMP protocol entity.

### snmpEnableAuthenTraps

OID	1.3.6.1.2.1.11.30
Description	Indicates whether the SNMP agent process is permitted to generate authentication-failure traps. The value of this object overrides any configuration information; as such, it provides a means whereby all authentication-failure traps might be disabled. Possible values are enabled (1) or disabled (2).
Note	This object is stored in nonvolatile memory so that it remains constant between reinitializations of the switch. This value can be changed with the <code>agtCfgSet</code> command.



## 3 FE MIB objects

This chapter provides descriptions and other information specific to FE MIB object types and includes the following information:

- [FE MIB overview](#) next
- [FIBRE-CHANNEL-FE-MIB \(MIB-II branch\)](#), page 67
- [FCFABRIC-ELEMENT-MIB \(experimental branch\)](#), page 90

### FE MIB overview

HP supports two versions of the FE MIB:

- FIBRE-CHANNEL-FE-MIB (RFC2837) in the MIB-II branch.
- FCFABRIC-ELEMENT-MIB in the experimental branch.

The version of the FE MIB supported depends on the version of the Fabric OS. [Table 5](#) lists which FE MIB is supported in which Fabric OS version.

**Table 5** FE MIBs and supported Fabric OS versions

MIB	5.x	4.x	3.1.x	3.0.x	2.6.x
FIBRE-CHANNEL-FE-MIB (MIB-II branch)	Yes	Yes	Yes	Yes	No
FCFABRIC-ELEMENT-MIB (experimental branch)	No	No	No	Yes	Yes


### FIBRE-CHANNEL-FE-MIB (MIB-II branch)

This section contains definitions, descriptions, and other information specific to FIBRE-CHANNEL-FE-MIB (in the MIB-II branch), including:

- ["FIBRE-CHANNEL-FE-MIB organization"](#) on page 68
- ["Definitions for FIBRE-CHANNEL-FE-MIB"](#) on page 70
- ["fcFeConfig group"](#) on page 74
- ["fcFeStatus group"](#) on page 78
- ["fcFeError group"](#) on page 82
- ["feFcAccounting group"](#) on page 84
- ["fcFeCapability group"](#) on page 88

The descriptions of each of the MIB variables in this chapter come directly from the FIBRE-CHANNEL-FE-MIB itself. The notes that follow the descriptions are typically HP-specific information.

---

 **NOTE:** HP does not support the settable Write function for any of the Fibre Channel FE MIB objects except fcFxpPortPhyAdminStatus.

---

The object types in FIBRE-CHANNEL-FE-MIB are organized into the following groupings:

- Configuration
- Operational
- Error
- Accounting
- Capability

## FIBRE-CHANNEL-FE-MIB organization

Figure 16 through Figure 21 depict the organization and structure of FIBRE-CHANNEL-FE-MIB.

```
- iso (1)
  - org (3)
    - dod (6)
      - internet (1)
        - mgmt (2)
          - mib-2 (1)
            - fcFeMIB (75)
              - fcFeMIBObjects (1)
                - fcFeConfig (1)
                - fcFeStatus (2)
                - fcFeError (3)
                - fcFeAccounting (4)
                - fcFeCapabilities (5)
              - fcFeMIBConformance (2)
                - fcFeMIBCompliances (1)
                - fcFeMIBGroups (2)
```

**Figure 16** fcFeMIB hierarchy

```
- fcFeConfig (1.3.6.1.2.1.75.1.1)
  - fcFeFabricName (1)
  - fcFeElementName (2)
  - fcFeModuleCapacity (3)
  - fcFeModuleTable (4)
    - fcFeModuleEntry (1)
      - fcFeModuleIndex (1)
      - fcFeModuleDescr (2)
      - fcFeModuleObjectID (3)
      - fcFeModuleOperStatus (4)
      - fcFeModuleLastChange (5)
      - fcFeModuleFxpPortCapacity (6)
      - fcFeModuleName (7)
  - fcFxpPortTable (5)
    - fcFxpPortEntry (1)
      - fcFxpPortIndex (1)
      - fcFxpPortName (2)
      - fcFxpPortFcphVersionHigh (3)
      - fcFxpPortFcphVersionLow (4)
      - fcFxpPortBbCredit (5)
      - fcFxpPortRxBufSize (6)
      - fcFxpPortRatov (7)
      - fcFxpPortEdtov (8)
      - fcFxpPortCosSupported (9)
      - fcFxpPortIntermixSupported (10)
      - fcFxpPortStackedConnMode (11)
      - fcFxpPortClass2SeqDeliv (12)
      - fcFxpPortClass3SeqDeliv (13)
      - fcFxpPortHoldTime (14)
```

**Figure 17** fcFeConfig hierarchy

```

- fcFeStatus (1.3.6.1.2.1.75.1.2)
  - fcFxPortStatusTable (1)
    - fcFxPortStatusEntry (1)
      - fcFxPortID (1)
      - fcFxPortBbCreditAvailable (2)
      - fcFxPortOperMode (3)
      - fcFxPortAdminMode (4)
  - fcFxPortPhysTable (2)
    - fcFxPortPhysEntry (1)
      - fcFxPortPhysAdminStatus (1)
      - fcFxPortPhysOperStatus (2)
      - fcFxPortPhysLastChange (3)
      - fcFxPortPhysRttov (4)
  - fcFxloginTable (3)
    - fcFxloginEntry (1)
      - fcFxPortNxLoginIndex (1)
      - fcFxPortFcphVersionAgreed (2)
      - fcFxPortNxPortBbCredit (3)
      - fcFxPortNxPortRxDataFieldSize (4)
      - fcFxPortCosSuppAgreed (5)
      - fcFxPortIntermixSuppAgreed (6)
      - fcFxPortStackedConnModeAgreed (7)
      - fcFxPortClass2SeqDelivAgreed (8)
      - fcFxPortClass3SeqDelivAgreed (9)
      - fcFxPortNxPortName (10)
      - fcFxPortConnectedNxPort (11)
      - fcFxPortBbCreditModel (12)

```

**Figure 18** fcFeStatus Hierarchy

```

- fcFeError (1.3.6.1.2.1.75.1.3)
  - fcFxPortErrorTable (1)
    - fcFxPortErrorEntry (1)
      - fcFxPortLinkFailures (1)
      - fcFxPortSyncLosses (2)
      - fcFxPortSigLosses (3)
      - fcFxPortPrimSeqProtoErrors (4)
      - fcFxPortInvalidTxWords (5)
      - fcFxPortInvalidCrcs (6)
      - fcFxPortDelimiterErrors (7)
      - fcFxPortAddressIdErrors (8)
      - fcFxPortLinkResetIns (9)
      - fcFxPortLinkResetOuts (10)
      - fcFxPortOlsIns (11)
      - fcFxPortOlsOuts (12)

```

**Figure 19** fcFeError hierarchy

```

- fcFeAccounting (1.3.6.1.2.1.75.1.4)
  - fcFxPortC1AccountingTable (1)
    - fcFxPortC1AccountingEntry (1)
      - fcFxPortC1InFrames (1)
      - fcFxPortC1OutFrames (2)
      - fcFxPortC1InOctets (3)
      - fcFxPortC1OutOctets (4)
      - fcFxPortC1Discards (5)
      - fcFxPortC1FbsyFrames (6)
      - fcFxPortC1FrjtFrames (7)
      - fcFxPortC1InConnections (8)
      - fcFxPortC1OutConnections (9)
      - fcFxPortC1ConnTime (10)
    - fcFxPortC2AccountingTable (2)
      - fcFxPortC2AccountingEntry (1)
        - fcFxPortC2InFrames (1)
        - fcFxPortC2OutFrames (2)
        - fcFxPortC1InOctets (3)
        - fcFxPortC2OutOctets (4)
        - fcFxPortC2Discards (5)
        - fcFxPortC2FbsyFrames (6)
        - fcFxPortC2FrjtFrames (7)
    - fcFxPortC3AccountingTable (3)
      - fcFxPortC3AccountingEntry (1)
        - fcFxPortC3InFrames (1)
        - fcFxPortC3OutFrames (2)
        - fcFxPortC3InOctets (3)
        - fcFxPortC3OutOctets (4)
        - fcFxPortC3Discards (5)

```

**Figure 20** fcFeAccounting hierarchy

```

- fcFeCapabilities (1.3.6.1.2.1.75.1.5)
  - fcFxPortCapTable (1)
    - fcFxPortCapEntry (1)
      - fcFxPortCapFcphVersionHigh (1)
      - fcFxPortCapFcphVersionLow (2)
      - fcFxPortCapBbCreditMax (3)
      - fcFxPortCapBbCreditMin (4)
      - fcFxPortCapRxDataFieldSizeMax (5)
      - fcFxPortCapRxDataFieldSizeMin (6)
      - fcFxPortCapCos (7)
      - fcFxPortCapIntermix (8)
      - fcFxPortCapStackedConnMode (9)
      - fcFxPortCapClass2SeqDeliv (10)
      - fcFxPortCapClass3SeqDeliv (11)
      - fcFxPortCapHoldTimeMax (12)
      - fcFxPortCapHoldTimeMin (13)

```

**Figure 21** fcFeCapabilities hierarchy

## Definitions for FIBRE-CHANNEL-FE-MIB

The definitions in [Table 6](#) are used for fcFeMIB.

**Table 6** FIBRE-CHANNEL-FE-MIB definitions

Type definition	Value	Description
Display string	Octet string of size 0 to 255	<p>Textual information taken from the NVT ASCII character set as defined on pages 4, 10 and 11 of RFC 854. To summarize RFC 854, the NVT ASCII repertoire specifies:</p> <ul style="list-style-type: none"> <li>• The use of character codes 0-127 (decimal).</li> <li>• The graphic characters (32-126) are interpreted as U.S. ASCII.</li> <li>• NUL, LF, CR, BEL, BS, HT, VT, and FF have the special meanings specified in RFC 854.</li> <li>• The other 25 codes have no standard interpretation.</li> <li>• The sequence CR LF means newline.</li> <li>• The sequence CR NUL means carriage return.</li> <li>• An LF not preceded by a CR means moving to the same column on the next line.</li> <li>• The sequence CR x, for any x other than LF or NUL, is illegal. Note that this also means that a string can end with either CR LF or CR NUL, but not with CR.</li> </ul> <p>Any object defined using this syntax may not exceed 255 characters.</p>
Milliseconds	Integer from 0 to 2147383647	Time unit value in milliseconds
Microseconds	Integer from 0 to 2147383647	Time unit value in microseconds
FcNameId	Octet string of size 8	<p>World Wide Name (WWN) or Fibre Channel name associated with an FC entity. It is a Network_Destination_ID or Network_Source_ID composed of a value up to 60 bits wide, occupying the remaining 8 bytes while the first nibble identifies the format of the Name_Identifier.</p> <p>Name_Identifier hex values:</p> <p>0 (ignored)  1 (IEEE 48-bit address)  2 (IEEE extended)  3 (locally assigned)  4 (32-bit IP address)</p>
FabricName	Octet string of size 8	<p>The name identifier of a fabric. Each fabric provides a unique fabric name.</p> <p>Valid formats include:</p> <p>IEEE 48  Local</p>
FcPortName	Octet string of size 8	<p>The name identifier associated with a port.</p> <p>Valid formats include:</p> <p>IEEE 48  IEEE extended  Local</p>

**Table 6** FIBRE-CHANNEL-FE-MIB definitions (continued)

Type definition	Value	Description
FcAddressId	Octet string of size 3	A 24-bit value unique within the address space of a fabric.
FcRxDataFieldSize	Integer from 128 to 2112	Receive data field size of an Nx_Port or Fx_Port.
FcBbCredit	Integer from 0 to 32767	Buffer-to-buffer credit of an Nx_Port or Fx_Port.
FcphVersion	Integer from 0 to 255	Version of FC-PH supported by an Nx_Port or Fx_Port.
FcStackedConnMode	Integer from 1 to 3	Indicates the Class 1 Stacked Connect Mode supported by an Nx_Port or Fx_Port. 1 (none) 2 (transparent) 3 (lockedDown)
FcCosCap	Integer from 1 to 127	Class of service capability of an Nx_Port or Fx_Port. bit 0 (Class F) bit 1 (Class 1) bit 2 (Class 2) bit 3 (Class 3) bit 4 (Class 4) bit 5 (Class 5) bit 6 (Class 6) bit 7 (reserved for future)
FcOBaudRate	Integer according to FC-0 baud rates	1 (other) None of the below 2 (one-eighth) 155 Mbaud (12.5 MB/s) 4 (quarter) 266 Mbaud (25.0 MB/s) 8 (half) 532 Mbaud (50.0 MB/s) 16 (full) 1 Gbaud (100 MB/s) 32 (double) 2 Gbaud (200 MB/s) 64 (quadruple) 4 Gbaud (400 MB/s)
FcOBaudRateCap	Integer from 0 to 127	bit 0 (other) bit 1 (one-eighth) bit 2 (quarter) bit 3 (half) bit 4 (full) bit 5 (double) bit 6 (quadruple) bit 7 (Reserved for future)
FcOMediaCap	Integer from 0 to 65535	bit 0 (unknown) bit 1 (single mode fiber (sm)) bit 2 (multimode fiber 50 micron (m5)) bit 3 (multimode fiber 62.5 micron (m6)) bit 4 (video cable (tv)) bit 5 (miniature cable (mi)) bit 6 (shielded twisted pair (stp)) bit 7 (twisted wire (tw)) bit 8 (long video (lv)) bits 9-15 (Reserved for future use)



**Table 6** FIBRE-CHANNEL-FE-MIB definitions (continued)

Type definition	Value	Description
FcOMedium	Integer	1 (unknown) 2 (sm) 4 (m5) 8 (m6) 16 (tv) 32 (mi) 64 (stp) 128 (tw) 256 (lv)
FcOTxType	Integer	1 (unknown) 2 (longWaveLaser (LL)) 3 (shortWaveLaser (SL)) 4 (longWaveLED (LE)) 5 (electrical (EL)) 6 (shortWaveLaser-noOFC (SN))
FcODistance	Integer	The FC-0 distance range associated with a port transmitter: 1 (unknown) 2 (long) 3 (intermediate) 4 (short)
FcFeModuleCapacity	Integer from 1 to 256	Maximum number of modules within an FE; returns 1 for all devices.
FcFeFxPortCapacity	Integer from 1 to 256	Maximum number of Fx_Ports within a module.  For the SAN Switch 2/8-EL and SAN Switch 2/8V, the value is 8.  For the Brocade 4Gb SAN Switch for HP p-Class BladeSystem, the value is 12.  For the 4/8 SAN Switch, 4/16 SAN Switch, SAN Switch 2/16, and SAN Switch 2/16V, the value is 16.  For the SAN Switch 2/32 and SAN Switch 4/32, the value is 32.  For the Core Switch 2/64, the value is 64.  For the SAN Director 2/128, the value is 128.  For the 4/256 SAN Director, the value is 256.
FcFeModuleIndex	Integer from 1 to 256	Module index within a conceptual table.
FcFeFxPortIndex	Integer from 1 to 256	Fx_Port index within a conceptual table.
FcFeNxPortIndex	Integer from 1 to 256	Nx_Port index within a conceptual table.
FcFxPortMode	Integer	1 (unknown) 2 (F_Port) 3 (FL_Port)
FcBbCreditModel	Integer	BB_Credit model of an Fx_Port. 1 (regular) 2 (alternate)

## fcFeConfig group

This group consists of scalar objects and tables. It contains the configuration and service parameters of the FE and the Fx\_Ports.

The group represents a set of parameters associated with the FE or an Fx\_Port to support its Nx\_Ports.

### fcFeFabricName

OID	1.3.6.1.2.1.75.1.1.1
Description	The Name_Identifier of the fabric to which this FE belongs.
Note	Returns the WWN of the primary switch in the fabric.

### fcFeElementName

OID	1.3.6.1.2.1.75.1.1.2
Description	The Name_Identifier of the FE.
Note	Returns the WWN of the switch.

### fcFeModuleCapacity

OID	1.3.6.1.2.1.75.1.1.3
Description	The maximum number of modules in the FE, regardless of their current state.
Note	The valid value for all HP StorageWorks switches is 1.

### fc FE module table

This table contains one entry for each module, and information of the modules.

### fcFeModuleTable

OID	1.3.6.1.2.1.75.1.1.4
Description	A table that contains information about the modules, one entry for each module in the FE.

### fcFeModuleEntry

OID	1.3.6.1.2.1.75.1.1.4.1
Description	An entry containing the configuration parameters of a module.
Index	fcFeModuleIndex

### fcFeModuleIndex

OID	1.3.6.1.2.1.75.1.1.4.1.1
Description	Identifies the module within the FE for which this entry contains information. This value is never greater than fcFeModuleCapacity.

## fcFeModuleDescr

OID	1.3.6.1.2.1.75.1.1.4.1.2
Description	A textual description of the module. This value should include the full name and version identification of the module. It should contain printable ASCII characters.
Note	See " <a href="#">sysDescr</a> " on page 41.

## fcFeModuleObjectID

OID	1.3.6.1.2.1.75.1.1.4.1.3
Description	<p>The vendor's authoritative identification of the module. This value might be allocated within the SMI enterprises subtree (1.3.6.1.4.1) and provides a straightforward and unambiguous means for determining what kind of module is being managed.</p> <p>For example, this object could take the value 1.3.6.1.4.1.99649.3.9 if vendor Neufe Inc. was assigned the subtree 1.3.6.1.4.1.99649 and had assigned the identifier 1.3.6.1.4.1.99649.3.9 to its FeFiFo-16 PlugInCard.</p>
Note	See " <a href="#">sysObjectID</a> " on page 41.

## fcFeModuleOperStatus

OID	1.3.6.1.2.1.75.1.1.4.1.4
Description	<p>Indicates the operational status of the module:</p> <ul style="list-style-type: none"><li>• online (1): The module is functioning properly.</li><li>• offline (2): The module is not available.</li><li>• testing (3): The module is under testing.</li><li>• faulty (4): The module is defective in some way.</li></ul>

## fcFeModuleLastChange

OID	1.3.6.1.2.1.75.1.1.4.1.5
Description	Contains the value of sysUpTime when the module entered its current operational status. A value of 0 indicates that the operational status of the module has not changed since the agent last restarted.

## fcFeModuleFxPortCapacity

OID	1.3.6.1.2.1.75.1.1.4.1.6
Description	The number of Fx_Ports that can be contained within the module. Within each module, the ports are uniquely numbered in the range from 1 to fcFeModuleFxPortCapacity, inclusive. However, the numbers are not required to be contiguous.
Note	<p>The valid values are as follows:</p> <ul style="list-style-type: none"><li>• 8 for the SAN Switch 2/8-EL and SAN Switch 2/8V</li><li>• 12 for the Brocade 4Gb SAN Switch for HP p-Class BladeSystem</li><li>• 16 for the 4/8 SAN Switch, 4/16 SAN Switch, SAN Switch 2/16, and SAN Switch 2/16V</li><li>• 32 for the SAN Switch 2/32 and SAN Switch 4/32</li><li>• 64 for the Core Switch 2/64</li><li>• 128 for the SAN Director 2/128</li><li>• 256 for the 4/256 SAN Director</li></ul>

## fcFeModuleName

OID	1.3.6.1.2.1.75.1.1.4.1.7
Description	The Name_Identifier of the module.
Note	The return value is the WWN of the switch.

## Fx\_Port table

This table contains the port configuration parameters, one entry for each Fx\_Port.

## fcFxPortTable

OID	1.3.6.1.2.1.75.1.1.5
Description	A table that contains configuration and service parameters of the Fx_Ports, one entry for each Fx_Port in the FE.

## fcFxPortEntry

OID	1.3.6.1.2.1.75.1.1.5.1
Description	An entry containing the configuration and service parameters of an Fx_Port.
Index	fcFeModuleIndex fcFxPortIndex

## fcFxPortIndex

OID	1.3.6.1.2.1.75.1.1.5.1.1
Description	Identifies the Fx_Port within the module. This number ranges from 1 to the value of fcFeModulePortCapacity for the associated module. The value remains constant for the identified Fx_Port until the module is reinitialized.

## fcFxPortName

OID	1.3.6.1.2.1.75.1.1.5.1.2
Description	The WWN of this Fx_Port. Each Fx_Port has a unique port WWN within the fabric.
Note	The return value is the WWN of the port.

## Fx\_Port common service parameters

### fcFxPortFcphVersionHigh

OID	1.3.6.1.2.1.75.1.1.5.1.3
Description	The highest or most recent version of FC-PH that the Fx_Port is configured to support.

### fcFxPortFcphVersionLow

OID	1.3.6.1.2.1.75.1.1.5.1.4
Description	The lowest or earliest version of FC-PH that the Fx_Port is configured to support.

### fcFxPortBbCredit

OID	1.3.6.1.2.1.75.1.1.5.1.5
Description	The total number of receive buffers available for holding Class 1 connect-request, and Class 2 or 3 frames from the attached Nx_Port. It is for buffer-to-buffer flow control in the direction from the attached Nx_Port (if applicable) to Fx_Port.

### fcFxPortRxBufSize

OID	1.3.6.1.2.1.75.1.1.5.1.6
Description	The largest Data_Field Size (in octets) for an FT_1 frame that can be received by the Fx_Port.

### fcFxPortRatov

OID	1.3.6.1.2.1.75.1.1.5.1.7
Description	The Resource_Allocation_Timeout value configured for the Fx_Port. This is used as the time-out value for determining when to reuse an Nx_Port resource such as a Recovery_Qualifier. It represents the error detect time-out value (E_D_TOV) (see next object) plus twice the maximum time that a frame might be delayed within the fabric and still be delivered.

### fcFxPortEdtov

OID	1.3.6.1.2.1.75.1.1.5.1.8
Description	The E_D_TOV value configured for the Fx_Port. The Error_Detect_Timeout value is used as the time-out value for detecting an error condition.

## Fx\_Port class service parameters

### fcFxPortCosSupported

OID	1.3.6.1.2.1.75.1.1.5.1.9
Description	A value indicating the set of Classes of Service supported by the Fx_Port.

### fcFxPortIntermixSupported

OID	1.3.6.1.2.1.75.1.1.5.1.10
Description	A flag indicating whether the Fx_Port supports an Intermixed Dedicated Connection (IDC).

### fcFxPortStackedConnMode

OID	1.3.6.1.2.1.75.1.1.5.1.11
Description	A value indicating the mode of Stacked Connect supported by the Fx_Port.

### fcFxPortClass2SeqDeliv

OID	1.3.6.1.2.1.75.1.1.5.1.12
Description	A flag indicating whether Class 2 Sequential Delivery is supported by the Fx_Port.

## fcFxPortClass3SeqDeliv

OID	1.3.6.1.2.1.75.1.1.5.1.13
Description	A flag indicating whether Class 3 Sequential Delivery is supported by the Fx_Port.

## Other Fx\_Port parameters

### fcFxPortHoldTime

OID	1.3.6.1.2.1.75.1.1.5.1.14
Description	The maximum time (in microseconds) that the Fx_Port holds a frame before discarding the frame if it is unable to deliver the frame. The value 0 means that the Fx_Port does not support this parameter.

## fcFeStatus group

This group consists of tables that contain operational status and established service parameters for the FE and the attached Nx\_Ports.

## Fx\_Port status table

This table contains the operational status and parameters of the Fx\_Ports, one entry for each Fx\_Port.

### fcFxPortStatusTable

OID	1.3.6.1.2.1.75.1.2.1
Description	A table that contains operational status and parameters of the Fx_Ports, one entry for each Fx_Port in the FE.

### fcFxPortStatusEntry

OID	1.3.6.1.2.1.75.1.2.1.1
Description	An entry containing operational status and parameters of an Fx_Port.
Index	fcFeModuleIndex fcFxPortIndex

### fcFxPortID

OID	1.3.6.1.2.1.75.1.2.1.1.1
Description	The address identifier by which this Fx_Port is identified within the fabric. The Fx_Port might assign its address identifier to its attached Nx_Ports during fabric login.

### fcFxPortBbCreditAvailable

OID	1.3.6.1.2.1.75.1.2.1.1.2
Description	The number of buffers currently available for receiving frames from the attached port in the buffer-to-buffer flow control. The value should be less than or equal to fcFxPortBbCredit.

## fcFxPortOperMode

OID	1.3.6.1.2.1.75.1.2.1.1.3
Description	The current operational mode of the Fx_Port is unknown (1); fPort (2); flPort (3).

## fcFxPortAdminMode

OID	1.3.6.1.2.1.75.1.2.1.1.4
Description	The desired operational mode of the Fx_Port.

## Fx\_Port physical level table

This table contains the physical level status and parameters of the Fx\_Ports, one entry for each Fx\_Port in the FE.

## fcFxPortPhysTable

OID	1.3.6.1.2.1.75.1.2.2
Description	A table that contains the physical level status and parameters of the Fx_Ports, one entry for each Fx_Port in the FE.

## fcFxPortPhysEntry

OID	1.3.6.1.2.1.75.1.2.2.1
Description	An entry containing physical level status and parameters of an Fx_Port.
Index	fcFeModuleIndex fcFxPortIndex

## fcFxPortPhysAdminStatus

OID	1.3.6.1.2.1.75.1.2.2.1.1
Description	<p>The desired state of the Fx_Port. A management station might place the Fx_Port in a desired state by setting this object accordingly. Possible values are:</p> <ul style="list-style-type: none"><li>• online (1): Place port online.</li><li>• offline (2): Take port offline.</li><li>• testing (3): Initiate test procedures.</li></ul> <p>The testing state (3) indicates that no operational frames can be passed. When an FE initializes, all Fx_Ports start with fcFxPortPhysAdminStatus in the offline state (2). As the result of either explicit management action or per configuration information accessible by the FE, fcFxPortPhysAdminStatus is then changed to either the online (1) or testing (3) states or remains in the offline state (2).</p>

## fcFxPortPhysOperStatus

OID	1.3.6.1.2.1.75.1.2.2.1.2
Description	<p>The current operational status of the Fx_Port. Possible values are:</p> <ul style="list-style-type: none"><li>• online (1): Login might proceed.</li><li>• offline (2): Login cannot proceed.</li><li>• testing (3): Port is under test.</li><li>• linkFailure (4): Failure after online/testing.</li></ul> <p>The testing state (3) indicates that no operational frames can be passed. If fcFxPortPhysAdminStatus is offline (2), then fcFxPortPhysOperStatus should be offline (2). If fcFxPortPhysAdminStatus is changed to online (1), then fcFxPortPhysOperStatus should change to online (1) if the Fx_Port is ready to accept fabric login request from the attached Nx_Port; it should proceed and remain in the linkFailure (4) state only if there is a fault that prevents it from going to the online state (1).</p>

## fcFxPortPhysLastChange

OID	1.3.6.1.2.1.75.1.2.2.1.3
Description	The value of sysUpTime at the time the Fx_Port entered its current operational status. A value of 0 indicates that the Fx_Port operational status has not changed since the agent last restarted.

## fcFxPortPhysRttov

OID	1.3.6.1.2.1.75.1.2.2.1.4
Description	The Receiver_Transmitter_Timeout value of the Fx_Port. This is used by the receiver logic to detect loss of synchronization.
Note	This object is read-only. It is listed in the MIB definition as read-write (which is incorrect).

## Fx\_Port fabric login table

This table contains one entry for each Fx\_Port in the FE and the service parameters that have been established from the most recent fabric login, whether implicit or explicit.

## fcFxloginTable

OID	1.3.6.1.2.1.75.1.2.3
Description	A table that contains services parameters established from the most recent fabric login, explicit or implicit, one entry for each Fx_Port in the FE.

## fcFxloginEntry

OID	1.3.6.1.2.1.75.1.2.3.1
Description	An entry containing service parameters established from a successful fabric login.
Index	fcFxloginModuleIndex, fcFxloginFxPortIndex, fcFxloginNxPortIndex

## fcFxPortNxLoginIndex

OID	1.3.6.1.2.1.75.1.2.3.1.1
Description	The associated Nx_Port in the attachment for which the entry contains information.



### fcFxPortFcphVersionAgreed

OID	1.3.6.1.2.1.75.1.2.3.1.2
Description	The version of FC-PH that the Fx_Port has agreed to support from the fabric login.

### fcFxPortNxPortBbCredit

OID	1.3.6.1.2.1.75.1.2.3.1.3
Description	The total number of buffers available for holding a Class 1 connect-request and Class 2 or Class 3 frames to be transmitted to the attached Nx_Port. It is for buffer-to-buffer flow control in the direction from Fx_Port to Nx_Port. The buffer-to-buffer flow control mechanism is indicated in the respective fcFxPortBbCreditModel.

### fcFxPortNxPortRxDataFieldSize

OID	1.3.6.1.2.1.75.1.2.3.1.4
Description	The Receive Data Field Size of the attached Nx_Port. This is a binary value that specifies the largest Data Field Size for an FT_1 frame that can be received by the Nx_Port. The value is a number of bytes in the range 128 to 2112, inclusive.

### fcFxPortCosSuppAgreed

OID	1.3.6.1.2.1.75.1.2.3.1.5
Description	Indicates that the attached Nx_Port has requested the Fx_Port for the support of classes of services and the Fx_Port has granted the request.

### fcFxPortIntermixSuppAgreed

OID	1.3.6.1.2.1.75.1.2.3.1.6
Description	<p>A variable indicating that the attached Nx_Port has requested the Fx_Port for Intermix support, and the Fx_Port has granted the request. This flag is valid only if Class 1 service is supported. Possible values are:</p> <ul style="list-style-type: none"><li>• yes (1): The attached Nx_Port has requested the Fx_Port for Intermix support, and the Fx_Port has granted the request.</li><li>• no (2): The attached Nx_Port has not requested the Fx_Port for Intermix support.</li></ul>

### fcFxPortStackedConnModeAgreed

OID	1.3.6.1.2.1.75.1.2.3.1.7
Description	Indicates whether the Fx_Port has agreed to support Stacked Connect from the fabric login. This is meaningful only if Class 1 service has been agreed to.

## fcFxPortClass2SeqDelivAgreed

OID	1.3.6.1.2.1.75.1.2.3.1.8
Description	Indicates whether the Fx_Port has agreed to support Class 2 sequential delivery from the fabric login. This is meaningful only if Class 2 service has been agreed to. Possible values are: <ul style="list-style-type: none"><li>• yes (1): The Fx_Port has agreed to support Class 2 sequential delivery from the fabric login.</li><li>• no (2): The Fx_Port has not agreed to support Class 2 sequential delivery from the fabric login.</li></ul>

## fcFxPortClass3SeqDelivAgreed

OID	1.3.6.1.2.1.75.1.2.3.1.9
Description	A flag indicating whether the Fx_Port has agreed to support Class 3 sequential delivery from the fabric login. This is meaningful only if Class 3 service has been agreed to. Possible values are: <ul style="list-style-type: none"><li>• yes (1): The Fx_Port has agreed to support Class 3 sequential delivery from the fabric login.</li><li>• no (2): The Fx_Port has not agreed to support Class 3 sequential delivery from the fabric login.</li></ul>

## fcFxPortNxPortName

OID	1.3.6.1.2.1.75.1.2.3.1.10
Description	The port name of the attached Nx_Port, if applicable. If the value of this object is '0000000000000000'H, this Fx_Port has no Nx_Port attached to it.

## fcFxPortConnectedNxPort

OID	1.3.6.1.2.1.75.1.2.3.1.11
Description	The address identifier of the destination Fx_Port with which this Fx_Port is currently engaged in either a Class 1 or loop connection. If the value of this object is '000000'H, this Fx_Port is not engaged in a connection.

## fcFxPortBbCreditModel

OID	1.3.6.1.2.1.75.1.2.3.1.12
Description	Identifies the BB_Credit model used by the Fx_Port. The regular model refers to the buffer-to-buffer flow control mechanism defined in FC-PH [1] used between the F_Port and the N_Port. For FL_Ports, the alternate buffer-to-buffer flow control mechanism as defined in FC-AL [4] is used between the FL_Port and any attached NL_Ports.

## fcFeError group

This group consists of tables that contain information about the various types of errors detected. The management station might use the information in this group to determine the quality of the link between the Fx\_Port and its attached Nx\_Port.

Implementation of this group is optional.

## Fx\_Port error table

This table contains counters that record numbers of errors detected since the management agent reinitialized, one entry for each Fx\_Port in the FE.

The first six columnar objects after the port index correspond to the counters in the Link Error Status Block.

### fcFxPortErrorTable

OID	1.3.6.1.2.1.75.1.3.1
Description	A table that contains counters that record the numbers of errors detected, one entry for each Fx_Port.

### fcFxPortErrorEntry

OID	1.3.6.1.2.1.75.1.3.1.1
Description	An entry containing error counters of a Fx_Port.
Index	fcFxPortErrorModuleIndex fcFxPortErrorFxPortIndex

### fcFxPortLinkFailures

OID	1.3.6.1.2.1.75.1.3.1.1.1
Description	The number of link failures detected by this Fx_Port.

### fcFxPortSyncLosses

OID	1.3.6.1.2.1.75.1.3.1.1.2
Description	The number of loss of synchronization errors detected by the Fx_Port.

### fcFxPortSigLosses

OID	1.3.6.1.2.1.75.1.3.1.1.3
Description	The number of loss of signal errors detected by the Fx_Port.

### fcFxPortPrimSeqProtoErrors

OID	1.3.6.1.2.1.75.1.3.1.1.4
Description	The number of primitive sequence protocol errors detected by the Fx_Port.

### fcFxPortInvalidTxWords

OID	1.3.6.1.2.1.75.1.3.1.1.5
Description	The number of invalid transmission word errors detected by the Fx_Port.

### fcFxPortInvalidCrcs

OID	1.3.6.1.2.1.75.1.3.1.1.6
Description	The number of invalid cyclic redundancy checks (CRCs) detected by this Fx_Port.

## fcFxPortDelimiterErrors

OID	1.3.6.1.2.1.75.1.3.1.1.7
Description	The number of delimiter errors detected by this Fx_Port.

## fcFxPortAddressIdErrors

OID	1.3.6.1.2.1.75.1.3.1.1.8
Description	The number of address identifier errors detected by this Fx_Port.

## fcFxPortLinkResetIns

OID	1.3.6.1.2.1.75.1.3.1.1.9
Description	The number of Link Reset Protocol errors received by this Fx_Port from the attached Nx_Port.

## fcFxPortLinkResetOuts

OID	1.3.6.1.2.1.75.1.3.1.1.10
Description	The number of Link Reset Protocol errors issued by this Fx_Port to the attached Nx_Port.

## fcFxPortOlsIns

OID	1.3.6.1.2.1.75.1.3.1.1.11
Description	The number of Offline Sequence errors received by this Fx_Port.

## fcFxPortOlsOuts

OID	1.3.6.1.2.1.75.1.3.1.1.12
Description	The number of Offline Sequence issued by this Fx_Port.

## feFcAccounting group

The Accounting group is supported only in Fabric OS 4.x.

The Accounting group consists of the following tables:

- Class 1 accounting table
- Class 2 accounting table
- Class 3 accounting table

Each table contains accounting information for the Fx\_Ports in the FE.

## Class 1 accounting table

### fcFxPortC1AccountingTable

OID	1.3.6.1.2.1.75.1.4.1
Description	A table that contains Class 1 accounting information recorded since the management agent reinitialized, one entry for each Fx_Port in the FE.

### fcFxPortC1AccountingEntry

OID	1.3.6.1.2.1.75.1.4.1.1
Description	An entry containing Class 1 accounting information for each Fx_Port.
Index	fcFeModuleIndex, fcFePortIndex

### fcFxPortC1InFrames

OID	1.3.6.1.2.1.75.1.4.1.1.1
Description	The number of Class 1 frames (other than Class 1 connect-request) received by this Fx_Port from its attached Nx_Port.

### fcFxPortC1OutFrames

OID	1.3.6.1.2.1.75.1.4.1.1.2
Description	The number of Class 1 frames (other than Class 1 connect-request) delivered through this Fx_Port to its attached Nx_Port.

### fcFxPortC1InOctets

OID	1.3.6.1.2.1.75.1.4.1.1.3
Description	The number of Class 1 frame octets, including the frame delimiters, received by this Fx_Port from its attached Nx_Port.

### fcFxPortC1OutOctets

OID	1.3.6.1.2.1.75.1.4.1.1.4
Description	The number of Class 1 frame octets, including the frame delimiters, delivered through this Fx_Port its attached Nx_Port.

### fcFxPortC1Discards

OID	1.3.6.1.2.1.75.1.4.1.1.5
Description	The number of Class 1 frames discarded by this Fx_Port.

### fcFxPortC1FbsyFrames

OID	1.3.6.1.2.1.75.1.4.1.1.6
Description	The number of F_BSY frames generated by this Fx_Port against Class 1 connect-request.

### fcFxPortC1FrjtFrames

OID	1.3.6.1.2.1.75.1.4.1.1.7
Description	The number of F_RJT frames generated by this Fx_Port against Class 1 connect-request.

### fcFxPortC1InConnections

OID	1.3.6.1.2.1.75.1.4.1.1.8
Description	The number of Class 1 connections successfully established in which the attached Nx_Port is the source of the connect-request.

## fcFxPortC1OutConnections

OID	1.3.6.1.2.1.75.1.4.1.1.9
Description	The number of Class 1 connections successfully established in which the attached Nx_Port is the destination of the connect-request.

## fcFxPortC1ConnTime

OID	1.3.6.1.2.1.75.1.4.1.1.10
Description	The cumulative time that this Fx_Port has been engaged in Class 1 connection. The amount of time is counted from after a connect-request has been accepted until the connection is disengaged, either by an EOFdt or Link Reset.

## Class 2 accounting table

### fcFxPortC2AccountingTable

OID	1.3.6.1.2.1.75.1.4.2
Description	A table that contains Class 2 accounting information recorded since the management agent has reinitialized, one entry for each Fx_Port in the FE.

### fcFxPortC2AccountingEntry

OID	1.3.6.1.2.1.75.1.4.2.1
Description	An entry containing Class 2 accounting information for each Fx_Port.
Index	fcFeModuleIndex, fcFePortIndex

### fcFxPortC2InFrames

OID	1.3.6.1.2.1.75.1.4.2.1.1
Description	The number of Class 2 frames received by this Fx_Port from its attached Nx_Port.

### fcFxPortC2OutFrames

OID	1.3.6.1.2.1.75.1.4.2.1.2
Description	The number of Class 2 frames delivered through this Fx_Port to its attached Nx_Port.

### fcFxPortC2InOctets

OID	1.3.6.1.2.1.75.1.4.2.1.3
Description	The number of Class 2 frame octets, including the frame delimiters, received by this Fx_Port from its attached Nx_Port.

### fcFxPortC2OutOctets

OID	1.3.6.1.2.1.75.1.4.2.1.4
Description	The number of Class 2 frame octets, including the frame delimiters, delivered through this Fx_Port to its attached Nx_Port.

## fcFxPortC2Discards

OID	1.3.6.1.2.1.75.1.4.2.1.5
Description	The number of Class 2 frames discarded by this Fx_Port.

## fcFxPortC2FbsyFrames

OID	1.3.6.1.2.1.75.1.4.2.1.6
Description	The number of F_BSY frames generated by this Fx_Port against Class 2 frames.

## fcFxPortC2FrjtFrames

OID	1.3.6.1.2.1.75.1.4.2.1.7
Description	The number of F_RJT frames generated by this Fx_Port against Class 2 frames.

## Class 3 accounting table

### fcFxPortC3AccountingTable

OID	1.3.6.1.2.1.75.1.4.3
Description	A table that contains Class 3 accounting information recorded since the management agent has reinitialized, one entry for each Fx_Port in the FE.

### fcFxPortC3AccountingEntry

OID	1.3.6.1.2.1.75.1.4.3.1
Description	An entry containing Class 3 accounting information for each Fx_Port.
Index	fcFeModuleIndex, fcFePortIndex

## fcFxPortC3InFrames

OID	1.3.6.1.2.1.75.1.4.3.1.1
Description	The number of Class 3 frames received by this Fx_Port from its attached Nx_Port.

## fcFxPortC3OutFrames

OID	1.3.6.1.2.1.75.1.4.3.1.2
Description	The number of Class 3 frames delivered through this Fx_Port to its attached Nx_Port.

## fcFxPortC3InOctets

OID	1.3.6.1.2.1.75.1.4.3.1.3
Description	The number of Class 3 frame octets, including the frame delimiters, received by this Fx_Port from its attached Nx_Port.

## fcFxPortC3OutOctets

OID	1.3.6.1.2.1.75.1.4.3.1.4
Description	The number of Class 3 frame octets, including the frame delimiters, delivered through this Fx_Port to its attached Nx_Port.

## fcFxPortC3Discards

OID	1.3.6.1.2.1.75.1.4.3.1.5
Description	The number of Class 3 frames discarded by this Fx_Port.

## fcFeCapability group

This group consists of a table describing information about what each Fx\_Port is inherently capable of operating or supporting. A capability might be used as expressed in its respective object value in the Configuration group.

Implementation of this group is optional.

## Fx\_Port capability table

### fcFxPortCapTable

OID	1.3.6.1.2.1.75.1.5.1
Description	A table that contains the capabilities of the port within the FE, one entry for each Fx_Port.

### fcFxPortCapEntry

OID	1.3.6.1.2.1.75.1.5.1.1
Description	An entry containing the capabilities of a Fx_Port.
Index	fcFxPortCapModuleIndex fcFxPortCapFxPortIndex

### fcFxPortCapFcphVersionHigh

OID	1.3.6.1.2.1.75.1.5.1.1.1
Description	The highest or most recent version of FC-PH that the Fx_Port is capable of supporting.

### fcFxPortCapFcphVersionLow

OID	1.3.6.1.2.1.75.1.5.1.1.2
Description	The lowest or earliest version of FC-PH that the Fx_Port is capable of supporting.

### fcFxPortCapBbCreditMax

OID	1.3.6.1.2.1.75.1.5.1.1.3
Description	The maximum number of receive buffers available for holding Class 1 connect-request, and Class 2 or Class 3 frames from the attached Nx_Port.

### fcFxPortCapBbCreditMin

OID	1.3.6.1.2.1.75.1.5.1.1.4
Description	The minimum number of receive buffers available for holding Class 1 connect-request, and Class 2 or Class 3 frames from the attached Nx_Port.



### fcFxPortCapRxDataFieldSizeMax

OID	1.3.6.1.2.1.75.1.5.1.1.5
Description	The maximum size (in bytes) of the data field in a frame that the Fx_Port is capable of receiving from its attached Nx_Port.

### fcFxPortCapRxDataFieldSizeMin

OID	1.3.6.1.2.1.75.1.5.1.1.6
Description	The minimum size (in bytes) of the data field in a frame that the Fx_Port is capable of receiving from its attached Nx_Port.

### fcFxPortCapCos

OID	1.3.6.1.2.1.75.1.5.1.1.7
Description	A value indicating the set of Classes of Service that the Fx_Port is capable of supporting.

### fcFxPortCapIntermix

OID	1.3.6.1.2.1.75.1.5.1.1.8
Description	A flag indicating whether the Fx_Port is capable of supporting the intermixing of Class 2 and Class 3 frames during a Class 1 connection. This flag is valid only if the port is capable of supporting Class 1 service. Possible values are yes (1) and no (2).

### fcFxPortCapStackedConnMode

OID	1.3.6.1.2.1.75.1.5.1.1.9
Description	A value indicating the mode of Stacked Connect request that the Fx_Port is capable of supporting.

### fcFxPortCapClass2SeqDeliv

OID	1.3.6.1.2.1.75.1.5.1.1.10
Description	A flag indicating whether the Fx_Port is capable of supporting Class 2 Sequential Delivery. Possible values are yes (1) and no (2).

### fcFxPortCapClass3SeqDeliv

OID	1.3.6.1.2.1.75.1.5.1.1.11
Description	A flag indicating whether the Fx_Port is capable of supporting Class 3 Sequential Delivery. Possible values are yes (1) and no (2).

### fcFxPortCapHoldTimeMax

OID	1.3.6.1.2.1.75.1.5.1.1.12
Description	The maximum holding time (in microseconds) that the Fx_Port is capable of supporting.

## fcFxPortCapHoldTimeMin

OID 1.3.6.1.2.1.75.1.5.1.1.13

Description The minimum holding time (in microseconds) that the Fx\_Port is capable of supporting.

## FCFABRIC-ELEMENT-MIB (experimental branch)

---


 **NOTE:** The FCFABRIC-ELEMENT-MIB is supported only in Fabric OS 2.6.x and 3.0.x.

---

This section contains definitions, descriptions, and other information that is specific to FCFABRIC-ELEMENT-MIB (in the experimental branch), including the following:

- [FCFABRIC-ELEMENT-MIB organization](#), page 90
- [Definitions for FCFABRIC-ELEMENT-MIB](#), page 93
- [fcFeConfig group](#), page 96
- [fcFeOp group](#), page 101
- [fcFeError group](#), page 106
- [fcFeAcct group](#), page 108
- [fcFeCap group](#), page 108

---

 **NOTE:** HP does not support the settable Write function for any of the Fibre Channel FE MIB objects except [fcFxPortPhysAdminStatus](#).

---

The descriptions of each of the MIB variables in this chapter come directly from the FCFABRIC-ELEMENT-MIB itself. The notes that follow the descriptions typically pertain to HP-specific information.

The object types in FCFABRIC-ELEMENT-MIB are organized into the following groups:

- Configuration
- Operational
- Error
- Accounting (not supported)
- Capability

## FCFABRIC-ELEMENT-MIB organization

Figure 22 through Figure 27 show the organization and structure of FCFABRIC-ELEMENT-MIB.

```

- iso (1)
  - org (3)
    - dod (6)
      - internet (1)
        - experimental (3)
          - fibreChannel (42)
            - fcFabric (2)
              - fcFe (1)
                - fcFeConfig (1)
                  - fcFabricName (1)
                  - fcElementName (2)
                  - fcFeModuleCapacity (3)
                  - fcFeModuleTable (4)
                  - fcFxConfTable (5)
                - fcFeOp (2)
                  - fcFxPortOperTable (1)
                  - fcFxPortPhysTable (3)
                  - fcFxlogiTable (4)
                - fcFeError (3)
                  - fcFxPortErrorTable (1)
                - fcFeAcct (4)
                  - fcFxPortC1AcctTable (1)
                  - fcFxPortC2AcctTable (2)
                  - fcFxPortC3AcctTable (3)
                - fcFeCap (5)
                  - fcFxPortCapTable (1)

```

**Figure 22** FCFABRIC-ELEMENT-MIB overall tree structure

```

- fcFeConfig (1.3.6.1.3.42.2.1.1)
  - fcFabricName (1)
  - fcElementName (2)
  - fcFeModuleCapacity (3)
  - fcFeModuleTable (4)
    - fcFeModuleEntry (1)
      - fcFeModuleIndex (1)
      - fcFeModuleDescr (2)
      - fcFeModuleObjectID (3)
      - fcFeModuleOperStatus (4)
      - fcFeModuleLastChange (5)
      - fcFeModuleFxPortCapacity (6)
      - fcFeModuleName (7)
  - fcFxConfTable (5)
    - fcFxConfEntry (1)
      - fcFxConfModuleIndex (1)
      - fcFxConfFxPortIndex (2)
      - fcFxPortName (3)
      - fcFxPortFcphVersionHigh (4)
      - fcFxPortFcphVersionLow (5)
      - fcFxPortBbCredit (6)
      - fcFxPortRxBufSize (7)
      - fcFxPortRatov (8)
      - fcFxPortEdtov (9)
      - fcFxPortCosSupported (10)
      - fcFxPortIntermixSupported (11)
      - fcFxPortStackedConnMode (12)
      - fcFxPortClass2SeqDeliv (13)
      - fcFxPortClass3SeqDeliv (14)
      - fcFxPortHoldTime (15)
      - fcFxPortBaudRate (16)
      - fcFxPortMedium (17)
      - fcFxPortTxType (18)
      - fcFxPortDistance (19)

```

**Figure 23** fcFeConfig hierarchy

```

- fcFeOp (1.3.6.1.3.42.2.1.2)
  - fcFxPortOperTable (1)
    - fcFxPortOperEntry (1)
      - fcFxPortOperModuleIndex (1)
      - fcFxPortOperFxPortIndex (2)
      - fcFxPortID (3)
      - fcFPortAttachedPortName (4)
      - fcFPortConnectedPort (5)
      - fcFxPortBbCreditAvailable (6)
      - fcFxPortOperMode (7)
      - fcFxPortAdminMode (8)
  - fcFxPortPhysTable (3)
    - fcFxPortPhysEntry (1)
      - fcFxPortPhysModuleIndex (1)
      - fcFxPortPhysFxPortIndex (2)
      - fcFxPortPhysAdminStatus (3)
      - fcFxPortPhysOperStatus (4)
      - fcFxPortPhysLastChange (5)
      - fcFxPortPhysRttov (6)
  - fcFxlogiTable (4)
    - fcFxlogiEntry (1)
      - fcFxlogiModuleIndex (1)
      - fcFxlogiFxPortIndex (2)
      - fcFxlogiNxPortIndex (3)
      - fcFxPortFcphVersionAgreed (4)
      - fcFxPortNxPortBbCredit (5)
      - fcFxPortNxPortRxDataFieldSize (6)
      - fcFxPortCosSuppAgreed (7)
      - fcFxPortIntermixSuppAgreed (8)
      - fcFxPortStackedConnModeAgreed (9)
      - fcFxPortClass2SeqDelivAgreed (10)
      - fcFxPortClass3SeqDelivAgreed (11)
      - fcFxPortNxPortName (12)
      - fcFxPortConnectedNxPort (13)
      - fcFxPortBbCreditModel (14)

```

**Figure 24** fcFeOp hierarchy

```

- fcFeError (1.3.6.1.3.42.2.1.3)
  - fcFxPortErrorTable (1)
    - fcFxPortErrorEntry (1)
      - fcFxPortErrorModuleIndex (1)
      - fcFxPortErrorFxPortIndex (2)
      - fcFxPortLinkFailures (3)
      - fcFxPortSyncLosses (4)
      - fcFxPortSigLosses (5)
      - fcFxPortPrimSeqProtoErrors (6)
      - fcFxPortInvalidTxWords (7)
      - fcFxPortInvalidCrcs (8)
      - fcFxPortDelimiterErrors (9)
      - fcFxPortAddressIdErrors (10)
      - fcFxPortLinkResetIns (11)
      - fcFxPortLinkResetOuts (12)
      - fcFxPortOlsIns (13)
      - fcFxPortOlsOuts (14)

```

**Figure 25** fcFeError hierarchy

```
- fcFeAcct (1.3.6.1.3.42.2.1.4)
  (-- Not Supported --)
```

**Figure 26** fcFeAcct hierarchy

```
- fcFeCap (1.3.6.1.3.42.2.1.5)
  - fcFxPortCapTable (1)
    - fcFxPortCapEntry (1)
      - fcFxPortCapModuleIndex (1)
      - fcFxPortCapFxPortIndex (2)
      - fcFxPortCapFcphVersionHigh (3)
      - fcFxPortCapFcphVersionLow (4)
      - fcFxPortCapBbCreditMax (5)
      - fcFxPortCapBbCreditMin (6)
      - fcFxPortCapRxDataFieldSizeMax (7)
      - fcFxPortCapRxDataFieldSizeMin (8)
      - fcFxPortCapCos (9)
      - fcFxPortCapIntermix (10)
      - fcFxPortCapStackedConnMode (11)
      - fcFxPortCapClass2SeqDeliv (12)
      - fcFxPortCapClass3SeqDeliv (13)
      - fcFxPortCapHoldTimeMax (14)
      - fcFxPortCapHoldTimeMin (15)
      - fcFxPortCapBaudRates (16)
      - fcFxPortCapMedia (17)
```

**Figure 27** fcFeCap hierarchy

## Definitions for FCFABRIC-ELEMENT-MIB

The following definitions are used for FCFABRIC-ELEMENT-MIB.

**Table 7** FCFABRIC-ELEMENT-MIB definitions

Type definition	Value	Description
Display string	Octet string of size 0 to 255	<p>Textual information taken from the NVT ASCII character set as defined on pages 4, 10 and 11 of RFC 854. To summarize RFC 854, the NVT ASCII repertoire specifies:</p> <ul style="list-style-type: none"> <li>• The use of character codes 0-127 (decimal).</li> <li>• The graphic characters (32-126) are interpreted as U.S. ASCII.</li> <li>• NUL, LF, CR, BEL, BS, HT, VT, and FF have the special meanings specified in RFC 854.</li> <li>• The other 25 codes have no standard interpretation.</li> <li>• The sequence CR LF means newline.</li> <li>• The sequence CR NUL means carriage return.</li> <li>• An LF not preceded by a CR means moving to the same column on the next line.</li> <li>• The sequence CR x, for any x other than LF or NUL, is illegal. Note that this also means that a string can end with either CR LF or CR NUL, but not with CR.</li> </ul> <p>Any object defined using this syntax may not exceed 255 characters.</p>
Milliseconds	Integer from 0 to 2147383647	Time unit value in milliseconds
Microseconds	Integer from 0 to 2147383647	Time unit value in milliseconds
FcNameId	Octet string of size 8	<p>WWN or Fibre Channel name associated with an FC entry. This is a Network_Destination_ID or Network_Source_ID composed of a value up to 60 bits wide, occupying the remaining 8 bytes while the first nibble identifies the format of the Name_Identifier.</p> <p>Name_Identifier hex values:</p> <ul style="list-style-type: none"> <li>0 (Ignored)</li> <li>1 (IEEE 48-bit address)</li> <li>2 (IEEE extended)</li> <li>3 (Locally assigned)</li> <li>4 (32-bit IP address)</li> </ul>
FabricName	FcNameId	<p>The name identifier of a fabric. Each fabric provides a unique fabric name.</p> <p>Only the following formats are allowed:</p> <p>IEEE48 Local</p>
FcPortName	FcNameId	<p>The name identifier associated with a port</p> <p>Only the following formats are allowed:</p> <p>IEEE48 IEEE extended Local</p>
FcAddressId	Octet string of size 3	A 24-bit value unique within the address space of a fabric
FcRxDataFieldSize	Integer from 128 to 2112	Receive Data_Field size
FcBbCredit	Integer from 0 to 32767	Buffer-to-buffer credit
FcphVersion	Integer from 0 to 255	The version of FC-PH supported by an Nx_Port or Fx_Port

**Table 7** FCFABRIC-ELEMENT-MIB definitions (continued)

Type definition	Value	Description
FcStackedConnMode	Integer from 1 to 3	1 (none) 2 (transparent) 3 (lockedDown)
FcCosCap	Integer from 1 to 127	bit 0 (Class F) bit 1 (Class 1) bit 2 (Class 2) bit 3 (Class 3) bit 4 (Class 4) bit 5 (Class 5) bit 6 (Class 6) bit 7 (reserved for future)
FcOBaudRate	Integer according to FC-0 baud rates	1 (other)None of below 2 (one-eighth)155 Mbaud (12.5 MB/s) 4 (quarter) 266 Mbaud (25.0 MB/s) 8 (half) 532 Mbaud (50.0 MB/s) 16 (full) 1 Gbaud (100 MB/s) 32 (double) 2 Gbaud (200 MB/s) 64 (quadruple) 4 Gbaud (400 MB/s)
FcOBaudRateCap	Integer from 0 to 127	bit 0 (other) bit 1 (one-eighth) bit 2 (quarter) bit 3 (half) bit 4 (full) bit 5 (double) bit 6 (quadruple) bit 7 (reserved for future)
FcOMediaCap	Integer from 0 to 65535	bit 0 (unknown) bit 1 (single mode fiber (sm)) bit 2 (multimode fiber 50 micron (m5)) bit 3 (multimode fiber 62.5 micron (m6)) bit 4 (video cable (tv)) bit 5 (miniature cable (mi)) bit 6 (shielded twisted pair (stp)) bit 7 (twisted wire (tw)) bit 8 (long video (lv)) bits 9-15 (reserved for future use)
FcOMedium	Integer	1 (unknown) 2 (sm) 4 (m5) 8 (m6) 16 (tv) 32 (mi) 64 (stp) 128 (tw) 256 (lv)
FcOTxType	Integer	1 (unknown) 2 (longWaveLaser (LL)) 3 (shortWaveLaser (SL)) 4 (longWaveLED (LE)) 5 (electrical (EL)) 6 (shortWaveLaser-noOFC (SN))

**Table 7** FCFABRIC-ELEMENT-MIB definitions (continued)

Type definition	Value	Description
FcODistance	Integer	The FC-0 distance range associated with a port transmitter: 1 (unknown) 2 (long) 3 (intermediate) 4 (short)
FcFeModuleCapacity	Integer from 1 to 256	The maximum number of modules within a fabric element
FcFeFxPortCapacity	Integer from 1 to 256	The maximum number of Fx_Ports within a module
FcFeModuleIndex	Integer from 1 to 256	The module index within a conceptual table
FcFeFxPortIndex	Integer from 1 to 256	The Fx_Port index within a conceptual table
FcFeNxPortIndex	Integer from 1 to 256	The Nx_Port index within a conceptual table
FcFxPortMode	Integer	1 (unknown) 2 (fPort) 3 (flPort)
FcBbCreditModel	Integer	1 (regular) 2 (alternate)

## fcFeConfig group

This group consists of scalar objects and tables. It contains the configuration and service parameters of the FE and the Fx\_Ports.

The group represents a set of parameters associated with the FE or an Fx\_Port to support its Nx\_Ports.

Implementation of this group is mandatory.

### fcFabricName

OID	1.3.6.1.3.42.2.1.1.1
Description	The Name_Identifier of the fabric to which this FE belongs.
Note	Returns the WWN of the primary switch in the fabric.

### fcElementName

OID	1.3.6.1.3.42.2.1.1.2
Description	The Name_Identifier of the FE.
Note	Returns the WWN of the switch.

### fcFeModuleCapacity

OID	1.3.6.1.3.42.2.1.1.3
Description	The maximum number of modules in the FE, regardless of their current state.
Note	The Core Switch 2/64, SAN Director 2/128, and 4/256 SAN Director do not support this MIB variable.



## fc FE module table

This table contains information about the fc Fe modules, one entry for each module.

### fcFeModuleTable

OID	1.3.6.1.3.42.2.1.1.4
Description	A table that contains information about the modules, one entry for each module.

### fcFeModuleEntry

OID	1.3.6.1.3.42.2.1.1.4.1
Status	Mandatory
Description	An entry containing the configuration parameters of a module.
Index	fcFeModuleIndex

### fcFeModuleIndex

OID	1.3.6.1.3.42.2.1.1.4.1.1
Description	Identifies the module within the FE for which this entry contains information. This value is never greater than fcFeModuleCapacity.

### fcFeModuleDescr

OID	1.3.6.1.3.42.2.1.1.4.1.2
Description	A textual description of the module. This value should include the full name and version identification of the module. It should contain printable ASCII characters.
Note	See " <a href="#">sysDescr</a> " on page 41.

### fcFeModuleObjectID

OID	1.3.6.1.3.42.2.1.1.4.1.3
Description	<p>The vendor's authoritative identification of the module. This value might be allocated within the SMI enterprises subtree (1.3.6.1.4.1). It provides a straight-forward and unambiguous means for determining what kind of module is being managed.</p> <p>For example, this object could take the value 1.3.6.1.4.1.99649.3.9 if vendor Neufe Inc. was assigned the subtree 1.3.6.1.4.1.99649, and had assigned the identifier 1.3.6.1.4.1.99649.3.9 to its FeFiFo-16 PlugInCard.</p>
Note	See " <a href="#">sysObjectID</a> " on page 41.

### fcFeModuleOperStatus

OID	1.3.6.1.3.42.2.1.1.4.1.4
Description	<p>Indicates the operational status of the module:</p> <ul style="list-style-type: none"><li>• online (1): The module is functioning properly.</li><li>• offline (2): The module is not available.</li><li>• testing (3): The module is under testing.</li><li>• faulty (4): The module is defective in some way.</li></ul>

## fcFeModuleLastChange

OID	1.3.6.1.3.42.2.1.1.4.1.5
Description	Contains the value of "sysUpTime" on page 41 when the module entered its current operational status. A value of 0 indicates that the operational status of the module has not changed since the agent last restarted.

## fcFeModuleFxPortCapacity

OID	1.3.6.1.3.42.2.1.1.4.1.6
Description	The number of Fx_Port that can be contained within the module. Within each module, the ports are uniquely numbered in the range from 1 to fcFeModuleFxPortCapacity, inclusive; however, the numbers are not required to be contiguous.

## fcFeModuleName

OID	1.3.6.1.3.42.2.1.1.4.1.7
Description	The Name_Identifier of the module.
Note	The return value is the WWN of the switch.

## Fx\_Port configuration table

This table contains the configuration parameters of the ports, one entry for each Fx\_Port.

## fcFxConfTable

OID	1.3.6.1.3.42.2.1.1.5
Description	A table that contains configuration and service parameters of the Fx_Ports, one entry for each Fx_Port in the FE.

## fcFxConfEntry

OID	1.3.6.1.3.42.2.1.1.5.1
Description	An entry containing the configuration and service parameters of an Fx_Port.
Index	FcFxConfModuleIndex, fcFxConfFxPortIndex

## fcFxConfModuleIndex

OID	1.3.6.1.3.42.2.1.1.5.1.1
Description	Identifies the module containing the Fx_Port for which this entry contains information.

## fcFxConfFxPortIndex

OID	1.3.6.1.3.42.2.1.1.5.1.2
Description	Identifies the Fx_Port within the module. This number ranges from 1 to the value of fcFeModulePortCapacity for the associated module. The value remains constant for the identified Fx_Port until the module is reinitialized.

### fcFxPortName

OID	1.3.6.1.3.42.2.1.1.5.1.3
Description	The name identifier of this Fx_Port. Each Fx_Port has a unique port name within the address space of the fabric.
Note	The return value is the WWN of the port.

### fcFxPortFcphVersionHigh

OID	1.3.6.1.3.42.2.1.1.5.1.4
Description	The highest or most recent version of FC-PH that the Fx_Port is configured to support.

### fcFxPortFcphVersionLow

OID	1.3.6.1.3.42.2.1.1.5.1.5
Description	The lowest or earliest version of FC-PH that the Fx_Port is configured to support.

### fcFxPortBbCredit

OID	1.3.6.1.3.42.2.1.1.5.1.6
Description	The total number of receive buffers available for holding Class 1 connect-request, Class 2, or Class 3 frames from the attached Nx_Port. It is for buffer-to-buffer flow control in the direction from the attached Nx_Port (if applicable) to Fx_Port.

### fcFxPortRxBufSize

OID	1.3.6.1.3.42.2.1.1.5.1.7
Description	The largest Data_Field Size (in octets) for an FT_1 frame that can be received by the Fx_Port.

### fcFxPortRatov

OID	1.3.6.1.3.42.2.1.1.5.1.8
Description	The Resource_Allocation_Timeout Value configured for the Fx_Port. This is used as the time-out value for determining when to reuse an Nx_Port resource such as a Recovery_Qualifier. It represents E_D_TOV (see next object) plus twice the maximum time that a frame might be delayed within the fabric and still be delivered.

### fcFxPortEdtov

OID	1.3.6.1.3.42.2.1.1.5.1.9
Description	The E_D_TOV value configured for the Fx_Port. The Error_Detect_Timeout Value is used as the time-out value for detecting an error condition.

### fcFxPortCosSupported

OID	1.3.6.1.3.42.2.1.1.5.1.10
Description	A value indicating the set of Classes of Service supported by the Fx_Port.

### fcFxPortIntermixSupported

OID	1.3.6.1.3.42.2.1.1.5.1.11
Description	A flag indicating whether the Fx_Port supports an Intermixed Dedicated Connection. Possible values are yes (1) or no (2).

### fcFxPortStackedConnMode

OID	1.3.6.1.3.42.2.1.1.5.1.12
Description	A value indicating the mode of Stacked Connect supported by the Fx_Port.

### fcFxPortClass2SeqDeliv

OID	1.3.6.1.3.42.2.1.1.5.1.13
Description	A flag indicating whether Class 2 sequential delivery is supported by the Fx_Port. Possible values are yes (1) or no (2).

### fcFxPortClass3SeqDeliv

OID	1.3.6.1.3.42.2.1.1.5.1.14
Description	A flag indicating whether Class 3 sequential delivery is supported by the Fx_Port. Possible values are yes (1) or no (2).

### fcFxPortHoldTime

OID	1.3.6.1.3.42.2.1.1.5.1.15
Description	The maximum time (in microseconds) that the Fx_Port holds a frame before discarding the frame if it is unable to deliver the frame. The value 0 means that the Fx_Port does not support this parameter.

### fcFxPortBaudRate

OID	1.3.6.1.3.42.2.1.1.5.1.16
Description	The FC-0 baud rate of the Fx_Port.
Note	The Core Switch 2/64, SAN Director 2/128, and 4/256 SAN Director do not support this MIB variable.

### fcFxPortMedium

OID	1.3.6.1.3.42.2.1.1.5.1.17
Description	The FC-0 medium of the Fx_Port.

### fcFxPortTxType

OID	1.3.6.1.3.42.2.1.1.5.1.18
Description	The FC-0 transmitter type of the Fx_Port.


## fcFxPortDistance

OID	1.3.6.1.3.42.2.1.1.5.1.19
Description	The FC-0 distance range of the Fx_Port transmitter.

## fcFeOp group

This group consists of tables that contain operational status and established service parameters for the FE and the attached Nx\_Ports.

---

 **NOTE:** Implementation of this group is mandatory.

---

## Fx\_Port operation table

This table contains one entry for each Fx\_Port, the operational status, and parameters of the Fx\_Ports.

### fcFxPortOperTable

OID	1.3.6.1.3.42.2.1.2.1
Description	A table that contains operational status, and parameters of the Fx_Ports, one entry for each Fx_Port in the FE.

### fcFxPortOperEntry

OID	1.3.6.1.3.42.2.1.2.1.1
Description	An entry containing operational status and parameters of an Fx_Port.
Index	fcFxPortOperModuleIndex, fcFxPortOperFxPortIndex

### fcFxPortOperModuleIndex

OID	1.3.6.1.3.42.2.1.2.1.1.1
Description	Identifies the module containing the Fx_Port for which this entry contains information.

### fcFxPortOperFxPortIndex

OID	1.3.6.1.3.42.2.1.2.1.1.2
Description	Identifies the Fx_Port within the module. This number ranges from 1 to the value of fcFeModulePortCapacity for the associated module. The value remains constant for the identified Fx_Port until the module is reinitialized.

### fcFxPortID

OID	1.3.6.1.3.42.2.1.2.1.1.3
Description	The address identifier by which this Fx_Port is identified within the fabric. The Fx_Port might assign its address identifier to its attached Nx_Ports during fabric login.

## fcFPortAttachedPortName

OID	1.3.6.1.3.42.2.1.2.1.1.4
Description	The port name of the attached N_Port, if applicable. If the value of this object is '0000000000000000'H, this Fx_Port has no Nx_Port attached to it. This variable has been deprecated and might be implemented for backward compatibility.

## fcFPortConnectedPort

OID	1.3.6.1.3.42.2.1.2.1.1.5
Description	The address identifier of the destination Fx_Port with which this Fx_Port is currently engaged in either a Class 1 or loop connection. If the value of this object is '000000'H, this Fx_Port is not engaged in a connection. This variable has been deprecated and might be implemented for backward compatibility.

## fcFxPortBbCreditAvailable

OID	1.3.6.1.3.42.2.1.2.1.1.6
Description	The number of buffers currently available for receiving frames from the attached port in the buffer-to-buffer flow control. The value should be less than or equal to fcFxPortBbCredit.

## fcFxPortOperMode

OID	1.3.6.1.3.42.2.1.2.1.1.7
Description	The current operational mode of the Fx_Port.

## fcFxPortAdminMode

OID	1.3.6.1.3.42.2.1.2.1.1.8
Description	The desired operational mode of the Fx_Port.

## Fx\_Port physical level table

This table contains one entry for each Fx\_Port in the FE, and the physical level status and parameters of the Fx\_Ports.

## fcFxPortPhysTable

OID	1.3.6.1.3.42.2.1.2.3
Description	A table that contains physical level status and parameters of the Fx_Ports, one entry for each Fx_Port in the FE.

## fcFxPortPhysEntry

OID	1.3.6.1.3.42.2.1.2.3.1
Description	An entry containing physical level status and parameters of an Fx_Port.
Index	fcFxPortPhysModuleIndex, fcFxPortPhysFxPortIndex

## fcFxPortPhysModuleIndex

OID	1.3.6.1.3.42.2.1.2.3.1.1
Description	Identifies the module containing the Fx_Port for which this entry contains information.

## fcFxPortPhysFxPortIndex

OID	1.3.6.1.3.42.2.1.2.3.1.2
Description	Identifies the Fx_Port within the module. This number ranges from 1 to the value of fcFeModulePortCapacity for the associated module. The value remains constant for the identified Fx_Port until the module is reinitialized.

## fcFxPortPhysAdminStatus

OID	1.3.6.1.3.42.2.1.2.3.1.3
Description	<p>The desired state of the Fx_Port:</p> <ul style="list-style-type: none"><li>• online (1): Place port online.</li><li>• offline (2): Take port offline.</li><li>• testing (3): Initiate test procedures.</li></ul> <p>A management station might place the Fx_Port in a desired state by setting this object accordingly. The testing state (3) indicates that no operational frames can be passed. When an FE initializes, all Fx_Ports start with fcFxPortPhysAdminStatus in the offline state (2). As the result of either explicit management action or per configuration information accessible by the FE, fcFxPortPhysAdminStatus is then changed to either the online (1) or testing (3) state, or remains in the offline state (2).</p>

## fcFxPortPhysOperStatus

OID	1.3.6.1.3.42.2.1.2.3.1.4
Description	<p>The current operational status of the Fx_Port:</p> <ul style="list-style-type: none"><li>• online (1): Login might proceed.</li><li>• offline (2): Login cannot proceed.</li><li>• testing (3): Port is under test.</li><li>• link-failure (4): Failure after online/testing.</li></ul> <p>The testing state (3) indicates that no operational frames can be passed. If fcFxPortPhysAdminStatus is offline (2), then fcFxPortPhysOperStatus should be offline (2). If fcFxPortPhysAdminStatus is changed to online (1), then fcFxPortPhysOperStatus should change to 1 (online) if the Fx_Port is ready to accept fabric login request from the attached Nx_Port. It should proceed and remain in the link-failure state (4) if and only if there is a fault that prevents it from going to the online state (1).</p>

## fcFxPortPhysLastChange

OID	1.3.6.1.3.42.2.1.2.3.1.5
Description	The value of sysUpTime at the time the Fx_Port entered its current operational status. A value of 0 indicates that the Fx_Port's operational status has not changed since the agent last restarted.

## fcFxPortPhysRttov

OID	1.3.6.1.3.42.2.1.2.3.1.6
Description	The Receiver_Transmitter_Timeout value of the Fx_Port. This is used by the receiver logic to detect Loss of Synchronization.

## Fx\_Port fabric login table

This table contains one entry for each Fx\_Port in the FE, and the Service Parameters that have been established from the most recent fabric login, whether implicit or explicit.

## fcFxlogiTable

OID	1.3.6.1.3.42.2.1.2.4
Description	A table that contains, one entry for each Fx_Port in the FE, services parameters established from the most recent fabric login, explicit or implicit.

## fcFxlogiEntry

OID	1.3.6.1.3.42.2.1.2.4.1
Description	An entry containing service parameters established from a successful fabric login.
Index	fcFxloginModuleIndex, fcFxloginFxPortIndex, fcFxloginNxPortIndex

## fcFxlogiModuleIndex

OID	1.3.6.1.3.42.2.1.2.4.1.1
Description	Identifies the module containing the Fx_Port for which this entry contains information.

## fcFxlogiFxPortIndex

OID	1.3.6.1.3.42.2.1.2.4.1.2
Description	Identifies the Fx_Port within the module. This number ranges from 1 to the value of fcFeModulePortCapacity for the associated module. The value remains constant for the identified Fx_Port until the module is reinitialized.

## fcFxlogiNxPortIndex

OID	1.3.6.1.3.42.2.1.2.4.1.3
Description	The object identifies the associated Nx_Port in the attachment for which the entry contains information.

## fcFxPortFcphVersionAgreed

OID	1.3.6.1.3.42.2.1.2.4.1.4
Description	The version of FC-PH that the Fx_Port has agreed to support from the fabric login.



### fcFxPortNxPortBbCredit

OID	1.3.6.1.3.42.2.1.2.4.1.5
Description	The total number of buffers available for holding Class 1 connect-request Class 2 or Class 3 frames to be transmitted to the attached Nx_Port. It is for buffer-to-buffer flow control in the direction from Fx_Port to Nx_Port. The buffer-to-buffer flow control mechanism is indicated in the respective fcFxPortBbCreditModel.

### fcFxPortNxPortRxDataFieldSize

OID	1.3.6.1.3.42.2.1.2.4.1.6
Description	The Receive Data Field Size of the attached Nx_Port. This is a binary value that specifies the largest Data Field Size for an FT_1 frame that can be received by the Nx_Port. The value is a number of bytes in the range 128 to 2112, inclusive.

### fcFxPortCosSuppAgreed

OID	1.3.6.1.3.42.2.1.2.4.1.7
Description	Indicates that the attached Nx_Port has requested the Fx_Port for the support of classes of services and the Fx_Port has granted the request.

### fcFxPortIntermixSuppAgreed

OID	1.3.6.1.3.42.2.1.2.4.1.8
Description	A variable indicating that the attached Nx_Port has requested the Fx_Port for Intermix support and the Fx_Port has granted the request. This flag is valid only if Class 1 service is supported. Possible values are yes (1) or no (2).

### fcFxPortStackedConnModeAgreed

OID	1.3.6.1.3.42.2.1.2.4.1.9
Description	Indicates whether the Fx_Port has agreed to support Stacked Connect from the fabric login. This is meaningful only if Class 1 service has been agreed to.

### fcFxPortClass2SeqDelivAgreed

OID	1.3.6.1.3.42.2.1.2.4.1.10
Description	A variable indicating whether the Fx_Port has agreed to support Class 2 sequential delivery from the fabric login. This is meaningful only if Class 2 service has been agreed to. Possible values are yes (1) or no (2).

### fcFxPortClass3SeqDelivAgreed

OID	1.3.6.1.3.42.2.1.2.4.1.11
Description	A flag indicating whether the Fx_Port has agreed to support Class 3 sequential delivery from the fabric login. This is meaningful only if Class 3 service has been agreed to. Possible values are yes (1) or no (2).

## fcFxPortNxPortName

OID	1.3.6.1.3.42.2.1.2.4.1.12
Description	The port name of the attached Nx_Port, if applicable. If the value of this object is '0000000000000000'H, this Fx_Port has no Nx_Port attached to it.

## fcFxPortConnectedNxPort

OID	1.3.6.1.3.42.2.1.2.4.1.13
Description	The address identifier of the destination Fx_Port with which this Fx_Port is currently engaged in either a Class 1 or loop connection. If the value of this object is '000000'H, this Fx_Port is not engaged in a connection.

## fcFxPortBbCreditModel

OID	1.3.6.1.3.42.2.1.2.4.1.14
Description	Identifies the BB_Credit model used by the Fx_Port. The regular model refers to the buffer-to-buffer flow control mechanism defined in FC-PH [1] used between the F_Port and the N_Port. For FL_Ports, the alternate buffer-to-buffer flow control mechanism as defined in FC-AL [4] is used between the FL_Port and any attached NL_Ports.

## fcFeError group

This group consists of tables that contain information about the various types of errors detected. The management station might use the information in this group to determine the quality of the link between the Fx\_Port and its attached Nx\_Port.

Implementation of this group is optional.

### Fx\_Port error table

This table contains one entry for each Fx\_Port in the FE, and counters recording numbers of errors detected since the management agent reinitialized.

The first six columnar objects after the port index correspond to the counters in the Link Error Status Block.

## fcFxPortErrorTable

OID	1.3.6.1.3.42.2.1.3.1
Description	A table that contains one entry for each Fx_Port, and counters that record the numbers of errors detected since the management agent reinitialized.

## fcFxPortErrorEntry

OID	1.3.6.1.3.42.2.1.3.1.1
Description	An entry containing error counters of an Fx_Port.
Index	fcFxPortErrorModuleIndex, fcFxPortErrorFxPortIndex

## fcFxPortErrorModuleIndex

OID	1.3.6.1.3.42.2.1.3.1.1.1
Description	Identifies the module containing the Fx_Port for which this entry contains information.

### fcFxPortErrorFxPortIndex

OID	1.3.6.1.3.42.2.1.3.1.1.2
Description	Identifies the Fx_Port within the module. This number ranges from 1 to the value of fcFeModulePortCapacity for the associated module. The value remains constant for the identified Fx_Port until the module is reinitialized.

### fcFxPortLinkFailures

OID	1.3.6.1.3.42.2.1.3.1.1.3
Description	The number of link failures detected by this Fx_Port.

### fcFxPortSyncLosses

OID	1.3.6.1.3.42.2.1.3.1.1.4
Description	The number of loss of synchronization errors detected by the Fx_Port.

### fcFxPortSigLosses

OID	1.3.6.1.3.42.2.1.3.1.1.5
Description	The number of loss of signal errors detected by the Fx_Port.

### fcFxPortPrimSeqProtoErrors

OID	1.3.6.1.3.42.2.1.3.1.1.6
Description	The number of primitive sequence protocol errors detected by the Fx_Port.

### fcFxPortInvalidTxWords

OID	1.3.6.1.3.42.2.1.3.1.1.7
Description	The number of invalid transmission word errors detected by the Fx_Port.

### fcFxPortInvalidCrcs

OID	1.3.6.1.3.42.2.1.3.1.1.8
Description	The number of invalid CRCs detected by this Fx_Port.

### fcFxPortDelimiterErrors

OID	1.3.6.1.3.42.2.1.3.1.1.9
Description	The number of Delimiter errors detected by this Fx_Port.

### fcFxPortAddressIdErrors

OID	1.3.6.1.3.42.2.1.3.1.1.10
Description	The number of address identifier errors detected by this Fx_Port.

### fcFxPortLinkResetIns

OID	1.3.6.1.3.42.2.1.3.1.1.11
Description	The number of Link Reset Protocol errors received by this Fx_Port from the attached Nx_Port.

### fcFxPortLinkResetOuts

OID	1.3.6.1.3.42.2.1.3.1.1.12
Description	The number of Link Reset Protocol errors issued by this Fx_Port to the attached Nx_Port.

### fcFxPortOlsIns

OID	1.3.6.1.3.42.2.1.3.1.1.13
Description	The number of Offline Sequence errors received by this Fx_Port.

### fcFxPortOlsOuts

OID	1.3.6.1.3.42.2.1.3.1.1.14
Description	The number of Offline Sequence errors issued by this Fx_Port.

## fcFeAcct group

HP does not support Accounting tables; this section is not applicable.

## fcFeCap group

This group consists of a table describing information about what each Fx\_Port is inherently capable of operating or supporting. A capability might be used or not, as expressed in its respective object value in the Configuration group.

Implementation of this group is optional.

## Fx\_Port capability table

### fcFxPortCapTable

OID	1.3.6.1.3.42.2.1.5.1
Description	A table that contains one entry for each Fx_Port, and the capabilities of the port within the FE.

### fcFxPortCapEntry

OID	1.3.6.1.3.42.2.1.5.1.1
Description	An entry containing the capabilities of a Fx_Port.
Index	fcFxPortCapModuleIndex, fcFxPortCapFxPortIndex

### fcFxPortCapModuleIndex

OID	1.3.6.1.3.42.2.1.5.1.1.1
Description	Identifies the module containing the Fx_Port for which this entry contains information.

### fcFxPortCapFxPortIndex

OID	1.3.6.1.3.42.2.1.5.1.1.2
Description	Identifies the Fx_Port within the module. This number ranges from 1 to the value of fcFeModulePortCapacity for the associated module. The value remains constant for the identified Fx_Port until the module is reinitialized.

### fcFxPortCapFcphVersionHigh

OID	1.3.6.1.3.42.2.1.5.1.1.3
Description	The highest or most recent version of FC-PH that the Fx_Port is capable of supporting.

### fcFxPortCapFcphVersionLow

OID	1.3.6.1.3.42.2.1.5.1.1.4
Description	The lowest or earliest version of FC-PH that the Fx_Port is capable of supporting.

### fcFxPortCapBbCreditMax

OID	1.3.6.1.3.42.2.1.5.1.1.5
Description	The maximum number of receive buffers available for holding Class 1 connect-request Class 2 or Class 3 frames from the attached Nx_Port.

### fcFxPortCapBbCreditMin

OID	1.3.6.1.3.42.2.1.5.1.1.6
Description	The minimum number of receive buffers available for holding Class 1 connect-request Class 2 or Class 3 frames from the attached Nx_Port.

### fcFxPortCapRxDataFieldSizeMax

OID	1.3.6.1.3.42.2.1.5.1.1.7
Description	The maximum size (in bytes) of the Data Field in a frame that the Fx_Port is capable of receiving from its attached Nx_Port.

### fcFxPortCapRxDataFieldSizeMin

OID	1.3.6.1.3.42.2.1.5.1.1.8
Description	The minimum size (in bytes) of the Data Field in a frame that the Fx_Port is capable of receiving from its attached Nx_Port.

### fcFxPortCapCos

OID	1.3.6.1.3.42.2.1.5.1.1.9
Description	A value indicating the set of Classes of Service that the Fx_Port is capable of supporting.

### fcFxPortCapIntermix

OID	1.3.6.1.3.42.2.1.5.1.1.10
Description	A flag indicating whether the Fx_Port is capable of supporting the intermixing of Class 2 and Class 3 frames during a Class 1 connection. This flag is valid only if the port is capable of supporting Class 1 service. Possible values are yes (1) or no (2).

### fcFxPortCapStackedConnMode

OID	1.3.6.1.3.42.2.1.5.1.1.11
Description	A value indicating the mode of Stacked Connect request that the Fx_Port is capable of supporting.

### fcFxPortCapClass2SeqDeliv

OID	1.3.6.1.3.42.2.1.5.1.1.12
Description	A flag indicating whether the Fx_Port is capable of supporting Class 2 Sequential Delivery. Possible values are yes (1) or no (2).

### fcFxPortCapClass3SeqDeliv

OID	1.3.6.1.3.42.2.1.5.1.1.13
Description	A flag indicating whether the Fx_Port is capable of supporting Class 3 Sequential Delivery. Possible values are yes (1) or no (2).

### fcFxPortCapHoldTimeMax

OID	1.3.6.1.3.42.2.1.5.1.1.14
Description	The maximum holding time (in microseconds) that the Fx_Port is capable of supporting.

### fcFxPortCapHoldTimeMin

OID	1.3.6.1.3.42.2.1.5.1.1.15
Description	The minimum holding time (in microseconds) that the Fx_Port is capable of supporting.

### fcFxPortCapBaudRates

OID	1.3.6.1.3.42.2.1.5.1.1.16
Description	A value indicating the set of baud rates that the Fx_Port is capable of supporting. This variable has been deprecated and might be implemented for backward compatibility.

### fcFxPortCapMedia

OID	1.3.6.1.3.42.2.1.5.1.1.17
Description	A value indicating the set of media that the Fx_Port is capable of supporting. This variable has been deprecated and might be implemented for backward compatibility.

## 4 Entity MIB objects

This chapter provides descriptions and other information specific to Entity MIB object types and includes the following information:

- [Entity MIB overview](#) next
- [Entity MIB objects](#), page 115
- [Entity MIB trap](#), page 128
- [Entity MIB conformance information](#), page 129

### Entity MIB overview

Entity MIB is the module for representing multiple logical entities supported by a single SNMP agent. This MIB is supported only in Fabric OS 4.x.

The descriptions of each of the MIB variables in this chapter come directly from Entity MIB itself. The notes that follow the descriptions typically pertain to HP-specific information.

The object types in Entity MIB are organized into the following groups:

- [Entity MIB objects](#), page 115
- [Entity MIB trap](#), page 128
- [Entity MIB conformance information](#), page 129

### Entity MIB system organization of MIB objects

[Figure 28](#) through [Figure 34](#) show the organization and structure of the Entity MIB file system.

```
- iso (1)
  - org (3)
    - dod (6)
      - internet (1)
        - mgmt (2)
          - mib-2 (1)
            - entityMIB (47)
              - entityMIBObjects (1)
                - entityPhysical (1)
                - entityLogical (2)
                - entityMapping (3)
                - entityGeneral (4)
              - entityMIBTraps (2)
                - entityMIBTrapPrefix (0)
```

**Figure 28** Overall tree structure for Entity MIB

```

- entityPhysical (1.3.6.1.2.1.47.1.1)
  - entPhysicalTable (1)
    - entPhysicalTable containment hierarchy (entPhysicalContainsTable) (1)
      - entPhysicalIndex (1)
      - entPhysicalDescr (2)
      - entPhysicalVendorType (3)
      - entPhysicalContainedIn (4)
      - entPhysicalClass (5)
      - entPhysicalParentRelPos (6)
      - entPhysicalName (7)
      - entPhysicalHardwareRev (8)
      - entPhysicalFirmwareRev (9)
      - entPhysicalSoftwareRev (10)
      - entPhysicalSerialNum (11)
      - entPhysicalMfgName (12)
      - entPhysicalModelName (13)
      - entPhysicalAlias (14)
      - entPhysicalAssetID (15)
      - entPhysicalIsFRU (16)

```

**Figure 29** entityPhysical hierarchy

```

- entityLogical (1.3.6.1.2.1.47.1.2)
  - entLogicalTable (1)
    - entLogicalEntry (1)
      - entLogicalIndex (1)
      - entLogicalDescr (2)
      - entLogicalType (3)
      - entLogicalCommunity (4)
      - entLogicalTAddress (5)
      - entLogicalTDomain (6)
      - entLogicalContextEngineID (7)
      - entLogicalContextName (8)

```

**Figure 30** entityLogical hierarchy

```

- entityMapping (1.3.6.1.2.1.47.1.3)
  - entLPMappingTable (1)
    - entLPMappingEntry (1)
      - entLPPhysicalIndex (1)
  - entAliasMappingTable (2)
    - entAliasMappingEntry (1)
      - entAliasLogicalIndexOrZero (1)
      - entAliasMappingIdentifier (2)
  - entPhysicalContainsTable (3)
    - entPhysicalContainsEntry (1)
      - entPhysicalChildIndex (1)

```

**Figure 31** entityMapping hierarchy

```

- entityGeneral (1.3.6.1.2.1.47.1.4)
  - entLastChangeTime (1)

```

**Figure 32** entityGeneral hierarchy



```

- entityMIBTraps (1.3.6.1.2.1.47.2)
  - entityMIBTrapPrefix (0)
    - entConfigChange (1)

```

**Figure 33** entityMIBTrapPrefix hierarchy

```

- entityConformance (1.3.6.1.2.1.47.3)
  - entityCompliances (1)
    - entityCompliance (1)
    - entity2Compliance (2)
  - entityGroups (2)
    - entityPhysicalGroup (1)
    - entityLogicalGroup (2)
    - entityMappingGroup (3)
    - entityGeneralGroup (4)
    - entityNotificationsGroup (5)
    - entityPhysical2Group (6)
    - entityLogical2Group (7)

```

**Figure 34** entityConformance hierarchy

## Definitions for Entity MIB

Table 8 lists the objects or definitions that are imported into the Entity MIB and the modules from which they are imported.

**Table 8** Objects imported into the Entity MIB

Object	Imported from module
MODULE-IDENTITY	SNMPv2-SMI
OBJECT-TYPE	
NOTIFICATION-TYPE	
mib-2	
TDomain	SNMPv2-TC
TAddress	
TEXTUAL-CONVENTION	
AutonomousType	
RowPointer	
TimeStamp	
TruthValue	
MODULE-COMPLIANCE	SNMPv2-CONF
OBJECT-GROUP	
NOTIFICATION-GROUP	
SnmpAdminString	SNMP-FRAMEWORK-MIB

## Textual conventions

### PhysicalIndex

Status	Current
Description	Arbitrary value that uniquely identifies the physical entity. Value should be a small positive integer; index values for different physical entities are not necessarily contiguous.
Syntax	Integer (1... 2147483647)

### PhysicalClass

Status	Current
Description	An enumerated value that provides an indication of the general hardware type of a particular physical entity. There are no restrictions as to the number of entPhysicalEntries of each entPhysicalClass, which must be instantiated by an agent (see <a href="#">Table 9</a> ).
Syntax	Integer

**Table 9** Possible values for entPhysicalClass

Value	Description
other (1)	The physical entity class that is known but does not match any of the supported values.
unknown (2)	The physical entity class that is unknown to the agent.
chassis (3)	The physical entity class is an overall container for networking equipment. Any class of physical entity except a stack can be contained within a chassis. A chassis might be contained only within a stack.
backplane (4)	The physical entity class is a device for aggregating and forwarding networking traffic, such as a shared backplane in a modular Ethernet switch. Note that an agent might model a backplane as a single physical entity, which is actually implemented as multiple discrete physical components (within a chassis or stack).
container (5)	The physical entity class is capable of containing one or more removable physical entities, possibly of different types (such as a chassis slot or daughter-card holder). For example, each (empty or full) slot in a chassis is modeled as a container. Note that all removable physical entities should be modeled within a container entity, such as field-replaceable modules, fans, or power supplies. Note that all known containers, including empty containers, should be modeled by the agent.
powerSupply (6)	The physical entity class is a power-supplying component.
fan (7)	The physical entity class is a fan or other heat-reduction component.
sensor (8)	The physical entity class is a sensor, such as a temperature sensor within a router chassis.
module (9)	The physical entity class is a self-contained subsystem (such as a plug-in card or daughter-card). If it is removable, then it should be modeled within a container entity; otherwise, it should be modeled directly within another physical entity (for example, a chassis or another module).
port (10)	The physical entity class is a networking port, capable of receiving or transmitting networking traffic.
stack (11)	The physical entity class is a super-container (possibly virtual), intended to group together multiple chassis entities (such as a stack of multiple chassis entities). A stack might be realized by a virtual cable or a real interconnect cable attached to multiple chassis, or it can comprise multiple interconnect cables. A stack should not be modeled within any other physical entities, but a stack might be contained within another stack. Only chassis entities should be contained within a stack.

## SnmEngineIdOrNone

Status	Current	
Description	<p>A specially formatted SnmpEngineID string for use with the Entity MIB.</p> <p>If an instance of an object with syntax SnmpEngineIdOrNone has a non-zero length, then the object encoding and semantics are defined by the SnmpEngineID textual convention (see RFC2571).</p> <p>If an instance of an object with syntax SnmpEngineIdOrNone contains a zero-length string, then no appropriate SnmpEngineID is associated with the logical entity (that is, SNMPv3 not supported).</p>	
Syntax	OCTET STRING (SIZE(0..32))	Empty string or SnmpEngineID

## Entity MIB objects

The Entity MIB objects are divided into the following groups:

- ["Physical entity group"](#) on page 115
- ["Logical entity group"](#) on page 123
- ["Entity mapping group"](#) on page 125
- ["General group"](#) on page 128

The following sections list the MIBs in each group.

### Physical entity group

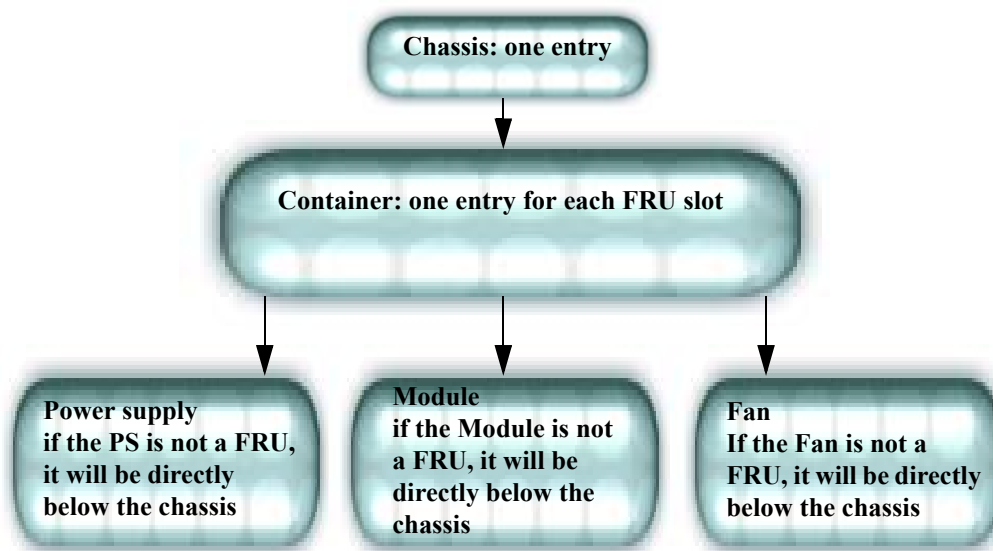
This section lists the entPhysicalTable MIBs.

#### entPhysicalTable

OID	1.3.6.1.2.1.47.1.1.1
Status	Current
Description	This table contains one row per physical entity (see <a href="#">Figure 35</a> ). The table always contains at least one row for an overall physical entity.
Note	This object is implemented for Fabric OS 4.1 and above. The overall physical entry for HP is the chassis; in Fabric OS 4.4 and later it is marked as a FRU. <a href="#">Table 10</a> shows the entPhysical table entries for HP StorageWorks switches.

**Table 10** entPhysical table entries for HP StorageWorks switches

HP StorageWorks platform	Blades	Fans	Power supplies	WWN card
4/8 SAN Switch and 4/16 SAN Switch	1	3 fans not a FRU	1 PS not a FRU	1 WWN unit not a FRU
SAN Switch 2/8V	1	3 fans not a FRU	1 PS not a FRU	1 WWN unit not a FRU
SAN Switch 2/16V	1	4 fans not a FRU	2 PS not a FRU	1 WWN unit not a FRU
SAN Switch 2/32	1	6 fans in 3 FRUs	2 PS	1 WWN unit not a FRU
SAN Switch 4/32	1	3 FRUs	2 PS	1 WWN unit not a FRU
Core Switch 2/64	10 blades	3 fans	4 PS	2 WWN units in 1 FRU
SAN Director 2/128	10 blades	3 fans	4 PS	2 WWN units in 1 FRU
4/256 SAN Director	10 blades	3 fans	4 PS	2 WWN units in 1 FRU
Brocade 4Gb SAN Switch for HP p-Class BladeSystem	N/A	N/A	N/A	N/A



**Figure 35** entPhysicalTable containment hierarchy (entPhysicalContainsTable)

## entPhysicalEntry

OID	1.3.6.1.2.1.47.1.1.1.1
Status	Current
Description	<p>Information about a particular physical entity.</p> <p>Each entry provides objects (entPhysicalDescr, entPhysicalVendorType, and entPhysicalClass) to help an NMS identify and characterize the entry, and objects (entPhysicalContainedIn and entPhysicalParentRelPos) to help an NMS relate the particular entry to other entries in this table.</p>
Index	entPhysicalIndex

## entPhysicalIndex

OID	1.3.6.1.2.1.47.1.1.1.1.1
Status	Current
Description	Unique identifier of the physical entity.

## entPhysicalDescr

OID	1.3.6.1.2.1.47.1.1.1.1.2
Status	Current
Description	A textual description of the physical entity (physical name of the entity, such as chassis, blade, port, and so forth). This object should contain a string that identifies the entity manufacturer's name and should be set to a distinct value for each version or model of the physical entity.
Note	The name provides the entity type and number (for example, slot 1, power supply, and so forth). The description gives the textual description of the type of the entry (for example, power supply, module, and so forth).

## entPhysicalVendorType

OID	1.3.6.1.2.1.47.1.1.1.1.3
Status	Current
Description	<p>An indication of the vendor-specific hardware type of the physical entity. Note that this is different from the definition of MIB-II sysObjectID.</p> <p>An agent should set this object to an enterprise-specific registration identifier value, indicating the specific type of equipment in detail. The associated instance of entPhysicalClass indicates the general type of hardware device.</p> <p>If no vendor-specific registration identifier exists for this physical entity or if the value is unknown by this agent, the value { 0, 0 } is returned.</p>
Note	Currently, NULL OID { 0, 0 } is returned.

## entPhysicalContainedIn

OID	1.3.6.1.2.1.47.1.1.1.1.4
Status	Current
Description	<p>The value of entPhysicalIndex for the physical entity that contains this physical entity. A value of 0 indicates this physical entity is not contained in any other physical entity. Note that the set of containment relationships defines a strict hierarchy; that is, recursion is not allowed.</p> <p>If a physical entity is contained by more than one physical entity (for example, double-wide modules), this object should identify the containing entity with the lowest value of entPhysicalIndex.</p>
Note	Value 0 for chassis entry. All containers have ContainedIn set to 1. All FRUs are contained in their respective slot container entries.

## entPhysicalClass

OID	1.3.6.1.2.1.47.1.1.1.1.5
Status	Current
Description	<p>An indication of the general hardware type of the physical entity.</p> <p>An agent should set this object to the standard enumeration value that most accurately indicates the general class of the physical entity, or the primary class if there is more than one.</p> <p>If no appropriate standard registration identifier exists for this physical entity, then the value <code>other(1)</code> is returned. If the value is unknown by this agent, then the value <code>unknown(2)</code> is returned.</p>
Note	<p>The Core Switch 2/64, SAN Director 2/128, and 4/256 SAN Director can have the following hierarchy of physical objects:</p> <ul style="list-style-type: none"><li>• Chassis: One entry (one row)</li><li>• Container: One entry for each FRU slot (eight port blades, two CPs, four power supplies, three fans)</li><li>• Module: Eight entries for port blades, two entries for CPs, four entries for power supplies, and three entries for fans</li></ul> <p>SAN Switch 2/32 can have the following hierarchy of physical objects:</p> <ul style="list-style-type: none"><li>• Chassis: One entry (one row)</li><li>• Container: One entry for each FRU slot (one switch blade, two power supplies, six fans)</li><li>• Module: One entry for switch blade, up to two entries for power supplies, and up to six entries for fans</li></ul> <p>SAN Switch 4/32 can have the following hierarchy of physical objects:</p> <ul style="list-style-type: none"><li>• Chassis: One entry (one row)</li><li>• Container: One entry for each FRU slot (one switch blade, two power supplies, three fans)</li><li>• Module: 1 entry for switch blade, up to two entries for power supplies, and up to three entries for fans</li></ul>

## entPhysicalParentRelPos

OID	1.3.6.1.2.1.47.1.1.1.1.6
Status	Current
Description	An indication of the relative position of this child component among all its sibling components. Sibling components are defined as entPhysicalEntries that share the same instance values of each of the entPhysicalContainedIn and entPhysicalClass objects.
Note	<p>For chassis entry, this value is <math>-1</math>; for containers, it is the sequential number of the container from the first one; for all FRUs, it is always 1.</p> <p>An NMS can use this object to identify the relative ordering for all sibling components of a particular parent (identified by the entPhysicalContainedIn instance in each sibling entry).</p> <p>This value should match any external labeling of the physical component, if possible. For example, for a container (such as a card slot) labeled slot #3, entPhysicalParentRelPos, should have the value 3. Note that the entPhysicalEntry for the module plugged into slot 3 should have an entPhysicalParentRelPos value of 1.</p> <p>If the physical position of this component does not match any external numbering or clearly visible ordering, then user documentation or other external reference material should be used to determine the parent-relative position. If this is not possible, then the agent should assign a consistent (but possibly arbitrary) ordering to a given set of sibling components, perhaps based on internal representation of the components.</p> <p>If the agent cannot determine the parent-relative position for some reason, or if the associated value of entPhysicalContainedIn is 0, then the value <math>-1</math> is returned; otherwise, a non-negative integer is returned, indicating the parent-relative position of this physical entity.</p> <p>Parent-relative ordering normally starts from 1 and continues to <math>n</math>, where <math>n</math> represents the highest-positioned child entity. However, if the physical entities (for example, slots) are labeled from a starting position of zero, then the first sibling should be associated with an entPhysicalParentRelPos value of 0. Note that this ordering might be sparse or dense, depending on agent implementation.</p> <p>The actual values returned are not globally meaningful, as each parent component might use different numbering algorithms. The ordering is meaningful only among siblings of the same parent component.</p> <p>The agent should retain parent-relative position values across reboots, either through algorithmic assignment or use of nonvolatile storage.</p>

## entPhysicalName

OID	1.3.6.1.2.1.47.1.1.1.1.7
Status	Current
Description	<p>The textual name of the physical entity (physical name of the entity such as chassis, blade, port, and so forth). The value of this object should be the name of the component as assigned by the local device and should be suitable for use in commands entered at the device's console. This might be a text name, such as <i>console</i>, or a simple component number (for example, port or module number) such as 1, depending on the physical component naming syntax of the device.</p> <p>If there is no local name, or this object is otherwise not applicable, then this object contains a zero-length string.</p> <p>Note that the value of entPhysicalName for two physical entities is the same in the event that the console interface does not distinguish between them (for example, slot-1 and the card in slot-1).</p>

Note	The name provides the type of the entry and its number (for example, slot 1, power supply, and so forth). The description gives the textual description of the type of the entry (for example, power supply, module, and so forth).
------	---

## entPhysicalHardwareRev

OID	1.3.6.1.2.1.47.1.1.1.1.8
Status	Current
Description	<p>The vendor-specific hardware revision string for the physical entity. The preferred value is the hardware revision identifier actually printed on the component itself (if present).</p> <p>Note that if revision information is stored internally in a nonprintable (for example, binary) format, then the agent must convert such information to a printable format, in an implementation-specific manner.</p> <p>If no specific hardware revision string is associated with the physical component, or if this information is unknown to the agent, then this object will contain a zero-length string.</p>
Note	Set to empty string.

## entPhysicalFirmwareRev

OID	1.3.6.1.2.1.47.1.1.1.1.9
Status	Current
Description	<p>The vendor-specific firmware revision string for the physical entity.</p> <p>Note that if revision information is stored internally in a nonprintable (for example, binary) format, then the agent must convert such information to a printable format, in an implementation-specific manner.</p> <p>If no specific firmware programs are associated with the physical component, or if this information is unknown to the agent, then this object will contain a zero-length string.</p>
Note	Set to empty string.

## entPhysicalSoftwareRev

OID	1.3.6.1.2.1.47.1.1.1.1.10
Status	Current
Description	<p>The vendor-specific software revision string for the physical entity.</p> <p>Note that if revision information is stored internally in a nonprintable (for example, binary) format, then the agent must convert such information to a printable format, in an implementation-specific manner.</p> <p>If no specific software programs are associated with the physical component, or if this information is unknown to the agent, then this object will contain a zero-length string.</p>
Note	Set to empty string.

## entPhysicalSerialNum

OID	1.3.6.1.2.1.47.1.1.1.1.11
Status	Current
Description	The vendor-specific serial number string for the physical entity. The preferred value is the serial number actually printed on the component (if present).



On the first instantiation of a physical entity, the value of entPhysicalSerialNum associated with that entity is set to the correct vendor-assigned serial number, if this information is available to the agent. If a serial number is unknown or nonexistent, the entPhysicalSerialNum is set to a zero-length string instead.

Note that implementations that can correctly identify the serial numbers of all installed physical entities do not need to provide write access to the entPhysicalSerialNum object. Agents that cannot provide nonvolatile storage for the entPhysicalSerialNum strings are not required to implement write access for this object.

Not every physical component has a serial number or even needs one. Physical entities for which the associated value of the entPhysicalIsFRU object is equal to false(2) (for example, the repeater ports within a repeater module) do not need their own unique serial number. An agent does not have to provide write access for such entities and might return a zero-length string.

If write access is implemented for an instance of entPhysicalSerialNum and a value is written into the instance, the agent must retain the supplied value in the entPhysicalSerialNum instance associated with the same physical entity for as long as that entity remains instantiated. This includes instantiations across all reinitializations/reboots of the network management system, including those that result in a change of the physical entity's entPhysicalIndex value.

Note Set to serial number and part number (if available), respectively.

## entPhysicalMfgName

OID 1.3.6.1.2.1.47.1.1.1.1.12

Status Current

Description The name of the manufacturer of this physical component. The preferred value is the name actually printed on the component (if present).

Note that comparisons between instances of the entPhysicalModelName, entPhysicalFirmwareRev, entPhysicalSoftwareRev, and the entPhysicalSerialNum objects are meaningful only amongst entPhysicalEntries with the same value of entPhysicalMfgName.

If the manufacturer name string associated with the physical component is unknown to the agent, then this object contains a zero-length string.

Note Set to empty string.

## entPhysicalModelName

OID 1.3.6.1.2.1.47.1.1.1.1.13

Status Current

Description The vendor-specific model name associated with this physical component. The preferred value is the customer-visible part number, which might be printed on the component.

If the model name string associated with the physical component is unknown to the agent, then this object contains a zero-length string.

Note Set to serial number and part number (if available) respectively.

## entPhysicalAlias

OID	1.3.6.1.2.1.47.1.1.1.1.14
Status	Current
Description	<p>This object is an alias name for the physical entity as specified by a network manager; it provides a nonvolatile handle for the physical entity.</p> <p>On the first instantiation of a physical entity, the value of entPhysicalAlias associated with that entity is set to the zero-length string. However, the agent might set the value to a locally unique default value instead of a zero-length string.</p> <p>If write access is implemented for an instance of entPhysicalAlias and a value is written into the instance, the agent must retain the supplied value in the entPhysicalAlias instance associated with the same physical entity for as long as that entity remains instantiated. This includes instantiations across all reinitializations/reboots of the network management system, including those that result in a change of the physical entity's entPhysicalIndex value.</p>
Note	Set to empty string.

## entPhysicalAssetID

OID	1.3.6.1.2.1.47.1.1.1.1.15
Status	Current
Description	<p>This object is a user-assigned asset tracking identifier for the physical entity as specified by a network manager; it provides nonvolatile storage of this information.</p> <p>On the first instantiation of a physical entity, the value of entPhysicalAssetID associated with that entity is set to the zero-length string.</p> <p>Not every physical component has an asset tracking identifier or even needs one. Physical entities for which the associated value of the entPhysicalIsFRU object is equal to false(2) (for example, the repeater ports within a repeater module) do not need their own unique asset tracking identifier. An agent does not have to provide write access for such entities and might instead return a zero-length string.</p> <p>If write access is implemented for an instance of entPhysicalAssetID and a value is written into the instance, the agent must retain the supplied value in the entPhysicalAssetID instance associated with the same physical entity for as long as that entity remains instantiated. This includes instantiations across all reinitializations/reboots of the network management system, including those that result in a change of the physical entity's entPhysicalIndex value.</p> <p>If no asset tracking information is associated with the physical component, then this object contains a zero-length string.</p>
Note	Set to empty string.

## entPhysicalIsFRU

OID	1.3.6.1.2.1.47.1.1.1.1.16
Status	Current
Description	<p>The entPhysicalIsFRU object indicates whether this physical entity is considered a FRU by the vendor. If this object contains the value true (1), then this entPhysicalEntry identifies a FRU. For all entPhysicalEntries representing components that are permanently contained within a FRU, the value false (2) should be returned for this object.</p>
Note	Set to true (1) for FRU entries (port blades, CPs, sensors, power supplies, and fans; false (2) for container and chassis type entries.

## Logical entity group

This section lists the entityLogical MIBs.

### entLogicalTable

OID	1.3.6.1.2.1.47.1.2.1
Description	This table contains one row per logical entity. For agents that implement more than one naming scope, at least one entry must exist. Agents that instantiate all MIB objects within a single naming scope are not required to implement this table.

### entLogicalEntry

OID	1.3.6.1.2.1.47.1.2.1.1
Description	Information about a particular logical entity. Entities might be managed by this agent or by other SNMP agents in the same chassis.
Index	entLogicalIndex

### entLogicalIndex

OID	1.3.6.1.2.1.47.1.2.1.1.1
Description	The value of this object uniquely identifies the logical entity. The value should be a small positive integer; index values for different logical entities are not necessarily contiguous.

### entLogicalDescr

OID	1.3.6.1.2.1.47.1.2.1.1.2
Description	A textual description of the logical entity. This object should contain a string that identifies the manufacturer's name for the logical entity and should be set to a distinct value for each version of the logical entity.

### entLogicalType

OID	1.3.6.1.2.1.47.1.2.1.1.3
Description	<p>An indication of the type of logical entity. This is typically the OID name of the node in the SMI's naming hierarchy that represents the major MIB module, or the majority of the MIB modules, supported by the logical entity. For example:</p> <ul style="list-style-type: none"><li>• A logical entity of a regular host/router -&gt; mib-2</li><li>• A logical entity of a 802.1d bridge -&gt; dot1dBridge</li><li>• A logical entity of a 802.3 repeater -&gt; snmpDot3RptrMgmt</li></ul> <p>If an appropriate node in the SMI's naming hierarchy cannot be identified, the value mib-2 should be used.</p>

## entLogicalCommunity

OID 1.3.6.1.2.1.47.1.2.1.1.4

Description An SNMPv1 or SNMPv2C community string, which can be used to access detailed management information for this logical entity. The agent should allow read access with this community string (to an appropriate subset of all managed objects) and might also return a community string based on the privileges of the request used to read this object.

Note that an agent might return a community string with read-only privileges, even if this object is accessed with a read-write community string. However, the agent must take care not to return a community string that allows more privileges than the community string used to access this object.

A compliant SNMP agent might want to conserve naming scopes by representing multiple logical entities in a single default naming scope. This is possible when the logical entities represented by the same value of entLogicalCommunity have no object instances in common. For example, bridge1 and repeater1 might be part of the main naming scope, but at least one additional community string is needed to represent bridge2 and repeater2.

Logical entities bridge1 and repeater1 would be represented by sysOREntries associated with the default naming scope.

For agents not accessible through SNMPv1 or SNMPv2C, the value of this object is the empty string. This object might also contain an empty string if a community string has not yet been assigned by the agent; otherwise, no community string with suitable access rights can be returned for a particular SNMP request.

Note that this object is deprecated. Agents that implement SNMPv3 access should use the entLogicalContextEngineID and entLogicalContextName objects to identify the context associated with each logical entity. SNMPv3 agents might return a zero-length string for this object or might continue to return a community string (for example, tri-lingual agent support).

## entLogicalAddress

OID 1.3.6.1.2.1.47.1.2.1.1.5

Description The transport service address by which the logical entity receives network management traffic, formatted according to the corresponding value of entLogicalTDomain.

For snmpUDPDomain, a TAddress is 6 octets long, the initial 4 octets containing the IP-address in network-byte order and the last 2 containing the UDP port in network-byte order. Consult *Transport Mappings for Version 2 of the Simple Network Management Protocol* (RFC1906) for further information on snmpUDPDomain.

## entLogicalTDomain

OID 1.3.6.1.2.1.47.1.2.1.1.6

Description Indicates the kind of transport service by which the logical entity receives network management traffic. Possible values for this object are currently found in the *Transport Mappings for SNMPv2* document (RFC1906).

## entLogicalContextEngineID

OID	1.3.6.1.2.1.47.1.2.1.1.7
Description	<p>The authoritative ContextEngineID that can be used to send an SNMP message concerning information held by this logical entity to the address specified by the associated entLogicalTAddress/entLogicalTDomain pair.</p> <p>This object, together with the associated entLogicalContextName object, defines the context associated with a particular logical entity; it allows access to SNMP engines identified by a ContextEngineID and contextName pair.</p> <p>If no value has been configured by the agent, a zero-length string is returned; or the agent might choose not to instantiate this object at all.</p>

## entLogicalContextName

OID	1.3.6.1.2.1.47.1.2.1.1.8
Description	<p>The contextName that can be used to send an SNMP message concerning information held by this logical entity to the address specified by the associated entLogicalTAddress/entLogicalTDomain pair.</p> <p>This object, together with the associated entLogicalContextEngineID object, defines the context associated with a particular logical entity and allows access to SNMP engines identified by a ContextEngineID and contextName pair.</p> <p>If no value has been configured by the agent, a zero-length string is returned; or the agent might choose not to instantiate this object at all.</p>

## Entity mapping group

This section lists the entityMapping MIBs.

### entLPMappingTable

OID	1.3.6.1.2.1.47.1.3.1
Description	<p>This table contains zero or more rows of logical entity to physical equipment associations. For each logical entity known by this agent, there are zero or more mappings to the physical resources used to realize that logical entity.</p> <p>An agent should limit the number and nature of entries in this table such that only meaningful and nonredundant information is returned. For example, in a system that contains a single power supply, mappings between logical entities and the power supply are not useful and should not be included.</p> <p>Also, only the most appropriate physical component that is closest to the root of a particular containment tree should be identified in an entLPMapping entry.</p> <p>For example, suppose a bridge is realized on a particular module and all ports on that module are ports on this bridge. A mapping between the bridge and the module would be useful, but additional mappings between the bridge and each of the ports on that module would be redundant (since the entPhysicalContainedIn hierarchy can provide the same information). If, however, more than one bridge were utilizing ports on this module, then mappings between each bridge and the ports it used would be appropriate.</p> <p>Also, in the case of a single backplane repeater, a mapping for the backplane to the single repeater entity is not necessary.</p>

## entLPMappingEntry

OID	1.3.6.1.2.1.47.1.3.1.1
Description	Information about an association of a logical entity to physical equipment. Note that the nature of the association is not specifically identified in this entry. It is expected that sufficient information exists in the MIBs used to manage a particular logical entity to infer how the physical component information is utilized.
Index	entLogicalIndex entLPPhysicalIndex

## entLPPhysicalIndex

OID	1.3.6.1.2.1.47.1.3.1.1.1
Description	The value of this object identifies the index value of a particular entPhysicalEntry associated with the indicated entLogicalEntity.

## entAliasMappingTable

OID	1.3.6.1.2.1.47.1.3.2
Description	This table contains zero or more rows, representing mappings of logical entity and physical component to external MIB identifiers. Each physical port in the system might be associated with a mapping to an external identifier, which itself is associated with a particular logical entity's naming scope. A wildcard mechanism is provided to indicate that an identifier is associated with more than one logical entity.

## entAliasMappingEntry

OID	1.3.6.1.2.1.47.1.3.2.1
Description	<p>Information about a particular physical component, logical entity to external identifier binding. Each logical entity/physical component pair might be associated with one alias mapping. The logical entity index might also be used as a wildcard (see the "<a href="#">entAliasLogicalIndexOrZero</a>" on page 126 object description for details.)</p> <p>Note that only entPhysicalIndex values that represent physical ports (that is, associated entPhysicalClass value is port(10)) are permitted to exist in this table.</p>
Index	entPhysicalIndex entAliasLogicalIndexOrZero

## entAliasLogicalIndexOrZero

OID	1.3.6.1.2.1.47.1.3.2.1.1
Description	<p>The value of this object identifies the logical entity that defines the naming scope for the associated instance of the entAliasMappingIdentifier object.</p> <p>If this object has a nonzero value, then it identifies the logical entity named by the same value of entLogicalIndex.</p> <p>If this object has a value of zero, then the mapping between the physical component and the alias identifier for this entAliasMapping entry is associated with all unspecified logical entities. That is, a value of zero (the default mapping) identifies any logical entity that does not have an explicit entry in this table for a particular entPhysicalIndex/entAliasMappingIdentifier pair.</p>

For example, to indicate that a particular interface (such as physical component 33) is identified by the same value of `ifIndex` for all logical entities, the following instance might exist:

```
entAliasMappingIdentifier.33.0 = ifIndex.5
```

In the event an `entPhysicalEntry` is associated differently for some logical entities, additional `entAliasMapping` entries might exist:

```
entAliasMappingIdentifier.33.0 = ifIndex.6
entAliasMappingIdentifier.33.4 = ifIndex.1
entAliasMappingIdentifier.33.5 = ifIndex.1
entAliasMappingIdentifier.33.10 = ifIndex.12
```

Note that entries with nonzero `entAliasLogicalIndexOrZero` index values have precedence over any zero-indexed entry. In this example, all logical entities except 4, 5, and 10 associate physical entity 33 with `ifIndex.6`.

## entAliasMappingIdentifier

OID 1.3.6.1.2.1.47.1.3.2.1.2

Description The value of this object identifies a particular conceptual row associated with the indicated `entPhysicalIndex` and `entLogicalIndex` pair.

Since only physical ports are modeled in this table, only entries that represent interfaces or ports are allowed. If an `ifEntry` exists on behalf of a particular physical port, then this object should identify the associated `ifEntry`. For repeater ports, the appropriate row in the `rpPtrPortGroupTable` should be identified instead.

For example, suppose a physical port was represented by `entPhysicalEntry.3`, `entLogicalEntry.15` existed for a repeater, and `entLogicalEntry.22` existed for a bridge. Then there might be two related instances of `entAliasMappingIdentifier`:

```
entAliasMappingIdentifier.3.15 == rpPtrPortGroupIndex.5.2
entAliasMappingIdentifier.3.22 == ifIndex.17
```

It is possible that other mappings (besides interfaces and repeater ports) might be defined in the future, as required.

Bridge ports are identified by examining the Bridge MIB and appropriate `ifEntries` associated with each `dot1dBasePort` and are thus not represented in this table.

## entPhysicalContainsTable

OID 1.3.6.1.2.1.47.1.3.3

Description A table that exposes the container/containee relationships between physical entities. This table provides all the information found by constructing the virtual containment tree for a given `entPhysicalTable`, but in a more direct format.

In the event a physical entity is contained by more than one other physical entity (for example, double-wide modules), this table should include these additional mappings, which cannot be represented in the `entPhysicalTable` virtual containment tree.

## entPhysicalContainsEntry

OID 1.3.6.1.2.1.47.1.3.3.1

Description A single container/containee relationship.

Index `entPhysicalIndex`  
`entPhysicalChildIndex`

## entPhysicalChildIndex

OID	1.3.6.1.2.1.47.1.3.3.1.1
Description	The value of entPhysicalIndex for the contained physical entity. Through this the containment hierarchy of the physical entities is displayed (see <a href="#">Figure 35</a> on page 116).

## General group

This section lists the entityGeneral MIB.

## entLastChangeTime

OID	1.3.6.1.2.1.47.1.4.1
Description	<p>The value of sysUpTime at the time a conceptual row is created, modified, or deleted in any of the following tables:</p> <ul style="list-style-type: none"><li>• entPhysicalTable</li><li>• entLogicalTable</li><li>• entLPMappingTable</li><li>• entAliasMappingTable</li><li>• entPhysicalContainsTable</li></ul>

## Entity MIB trap

This section lists the entityMIBTrap objects. [Figure 33](#) on page 113 displays the structure of the entityMIBTraps group.

## entConfigChange

OID	1.3.6.1.2.1.47.2.0.1
Status	Current
Description	<p>An entConfigChange notification is generated when the value of entLastChangeTime changes. It can be utilized by an NMS to trigger logical/physical entity table maintenance polls.</p> <p>An agent should not generate more than one entConfigChange notification event in a given time interval (five seconds is the suggested default). A notification event is the transmission of a single trap or inform PDU to a list of notification destinations.</p> <p>If additional configuration changes occur within the throttling period, then notification events for these changes should be suppressed by the agent until the current throttling period expires. At the end of a throttling period, one notification event should be generated if any configuration changes occurred since the start of the throttling period; in such a case, another throttling period is started right away.</p> <p>An NMS should periodically check the value of entLastChangeTime to detect any missed entConfigChange notification events: for example, due to throttling or transmission loss.</p>



## Entity MIB conformance information

This section lists the entityConformance MIBs. [Figure 34](#) on page 113 shows the structure of the entityConformance group.

### entityCompliance

OID	1.3.6.1.2.1.47.3.1.1
Status	Deprecated
Description	The compliance statement for SNMP entities that implement version 1 of the Entity MIB.
Module	This module MANDATORY-GROUPS { entityPhysicalGroup, entityLogicalGroup, entityMappingGroup, entityGeneralGroup, entityNotificationsGroup

### entity2Compliance

OID	1.3.6.1.2.1.47.3.1.2
Status	Current
Description	The compliance statement for SNMP entities that implement version 2 of the Entity MIB.
Module	This module MANDATORY-GROUPS { entityPhysicalGroup, entityPhysical2Group, entityGeneralGroup, entityNotificationsGroup
Group	entityLogical2Group
Description	Implementation of this group is not mandatory for agents that model all MIB object instances within a single naming scope.
Group	entityMappingGroup
Description	Implementation of the entPhysicalContainsTable is mandatory for all agents. Implementation of the entLPMMappingTable and entAliasMappingTables are not mandatory for agents that model all MIB object instances within a single naming scope.  Note that the entAliasMappingTable might be useful for all agents; however, implementation of the entityLogicalGroup or entityLogical2Group is required to support this table.
Object	entPhysicalSerialNum
Access	Not-accessible
Description	Read and write access is not required for agents that cannot identify serial number information for physical entities or cannot provide nonvolatile storage for NMS-assigned serial numbers.  Write access is not required for agents that can identify serial number information for physical entities but cannot provide nonvolatile storage for NMS-assigned serial numbers.  Write access is not required for physical entities for which the associated value of the entPhysicalIsFRU object is equal to false(2).

Object	entPhysicalAlias
Access	Read-only
Description	Write access is required only if the associated entPhysicalClass value is equal to chassis(3).
Object	entPhysicalAssetID
Access	Not-accessible
Description	Read and write access is not required for agents that cannot provide nonvolatile storage for NMS-assigned asset identifiers.  Write access is not required for physical entities for which the associated value of entPhysicalIsFRU is equal to false(2).

### entityPhysicalGroup

OID	1.3.6.1.2.1.47.3.2.1
Objects	entPhysicalDescr entPhysicalVendorType entPhysicalContainedIn entPhysicalClass entPhysicalParentRelPos entPhysicalName
Status	Current
Description	The collection of objects used to represent physical system components, for which a single agent provides management information.

### entityLogicalGroup

OID	1.3.6.1.2.1.47.3.2.2
Objects	entLogicalDescr entLogicalType entLogicalCommunity entLogicalTAddress entLogicalTDomain
Status	Deprecated
Description	The collection of objects used to represent the list of logical entities, for which a single agent provides management information.

### entityMappingGroup

OID	1.3.6.1.2.1.47.3.2.3
Objects	entLPPhysicalIndex entAliasMappingIdentifier entPhysicalChildIndex
Status	Current
Description	The collection of objects used to represent the associations between multiple logical entities, physical components, interfaces, and port identifiers, for which a single agent provides management information.

### entityGeneralGroup

OID	1.3.6.1.2.1.47.3.2.4
Objects	entLastChangeTime
Status	Current
Description	The collection of objects that represent general entity information for which a single agent provides management information.

### entityNotificationsGroup

OID	1.3.6.1.2.1.47.3.2.5
Notifications	entConfigChange
Status	Current
Description	The collection of notifications used to indicate Entity MIB data consistency and general status information.

### entityPhysical2Group

OID	1.3.6.1.2.1.47.3.2.6
Objects	entPhysicalHardwareRev entPhysicalFirmwareRev entPhysicalSoftwareRev entPhysicalSerialNum entPhysicalMfgName entPhysicalModelName entPhysicalAlias entPhysicalAssetID entPhysicalIsFRU
Status	Current
Description	The collection of objects used to represent physical system components, for which a single agent provides management information. This group augments the objects contained in the entityPhysicalGroup.

### entityLogical2Group

OID	1.3.6.1.2.1.47.3.2.7
Objects	entLogicalDescr entLogicalType entLogicalTAddress entLogicalTDomain entLogicalContextEngineID entLogicalContextName
Status	Current
Description	The collection of objects used to represent the list of logical entities, for which a single SNMP entity provides management information.



---

## 5 SW MIB objects

This chapter contains descriptions and other information specific to FC Switch MIB (SW-MIB) object types. This chapter provides information on:

- [SW MIB overview](#) next
- [sw traps](#), page 142
- [swSystem group](#), page 146
- [swFabric group](#), page 154
- [SW agent configuration group](#), page 158
- [Fibre Channel port group](#), page 159
- [Name server database group](#), page 165
- [Event group](#), page 167
- [Fabric watch group](#), page 168
- [End device group](#), page 177
- [Switch group](#), page 178
- [ASIC performance monitoring group](#), page 180
- [Trunking group](#), page 182

### SW MIB overview

The descriptions of the MIB variables in this chapter come directly from the FC Switch MIB. The notes that follow the descriptions typically pertain to HP-specific information.

### SW-MIB system organization of MIB objects

[Figure 36](#) through [Figure 48](#) show the organization and structure of SW-MIB.

```

- iso (1)
  - org (3)
    - dod (6)
      - internet (1)
        - private (4)
          - enterprises (1)
            - bsci (1588)
              - commDev (2)
                - fibreChannel (1)
                  - fcSwitch (1)
                    - sw (1)
                      - swTrapsV2 (0)
                      - swSystem (1)
                      - swFabric (2)
                      - swModule (3)
                      - swAgtCfg (4)
                      - swFCport (6)
                      - swNs (7)
                      - swEvent (8)
                      - swFwSystem (10)
                      - swEndDevice (21)
                      - swGroup (22)
                      - swBlmPerfMnt (23)
                      - swTrunk (24)
                      - sw28k (2)
                      - sw21kN24k (3)
                      - sw20x0 (4)
              - bsciReg (3)
                - bsciModules (1)
                  - sw21kN24k (3)
                  - sw20x0 (4)

```

**Figure 36** SW-MIB overall tree structure

```

- swTrapsV2 (1.3.6.1.4.1.1588.2.1.1.1.0)
  - swFault (1)
  - swSensorScn (2)
  - swFCPortScn (3)
  - swEventTrap (4)
  - swFabricWatchTrap (5)
  - swTrackChangesTrap (6)

```

**Figure 37** swTrapsV2 hierarchy

```

- swSystem (1.3.6.1.4.1.1588.2.1.1.1.1)
  - swCurrentDate (1)
  - swBootDate (2)
  - swFWLastUpdated (3)
  - swFlashLastUpdated (4)
  - swBootPromLastUpdated (5)
  - swFirmwareVersion (6)
  - swOperStatus (7)
  - swAdmStatus (8)
  - swTelnetShellAdmStatus (9)
  - swSsn (10)
  - swFlashDLOperStatus (11)
  - swFlashDLAdmStatus (12)
  - swFlashDLHost (13)
  - swFlashDLUser (14)
  - swFlashDLFile (15)
  - swFlashDLPassword (16)
  - swBeaconOperStatus (18)
  - swBeaconAdmStatus (19)
  - swDiagResult (20)
  - swNumSensors (21)
  - swSensorTable (22)
    - swSensorEntry (1)
      - swSensorIndex (1)
      - swSensorType (2)
      - swSensorStatus (3)
      - swSensorValue (4)
      - swSensorInfo (5)
  - swTrackChangesInfo (23)
  - swID (24)
  - swEtherIPAddress (25)
  - swEtherIPMask (26)
  - swFCIPAddress (27)
  - swFCIPMask (28)

```

**Figure 38** swSystem hierarchy

```

- swFabric (1.3.6.1.4.1.1588.2.1.1.1.2)
  - swDomainID (1)
  - swPrincipalSwitch (2)
  - swNumNbs (8)
  - swNbTable (9)
    - swNbEntry (1)
      - swNbIndex (1)
      - swNbMyPort (2)
      - swNbRemDomain (3)
      - swNbRemPort (4)
      - swNbBaudRate (5)
      - swNbIslState (6)
      - swNbIslCost (7)
      - swNbRemPortName (8)
  - swFabricMemTable (10)
    - swFabricMemEntry (1)
      - swFabricMemWwn (1)
      - swFabricMemDid (2)
      - swFabricMemName (3)
      - swFabricMemEIP (4)
      - swFabricMemFCIP (5)
      - swFabricMemGWIP (6)
      - swFabricMemType (7)
      - swFabricMemShortVersion (8)
      - swIDIDMode (11)

```

**Figure 39** swFabric hierarchy

```
- swModule (1.3.6.1.4.1.1588.2.1.1.1.3)
```

**Figure 40** swModule hierarchy

```
- swAgtCfg (1.3.6.1.4.1.1588.2.1.1.1.4)
  - swAgtCmtyTable (11)
    - swAgtCmtyEntry (1)
      - swAgtCmtyIdx (1)
      - swAgtCmtyStr (2)
      - swAgtTrapRcp (3)
      - swAgtTrapSeverityLevel (4)
```

**Figure 41** swAgtCfh hierarchy

```
- swFCport (1.3.6.1.4.1.1588.2.1.1.1.6)
  - swFCPortCapacity (1)
  - swFCPortTable (2)
    - swFCPortEntry (1)
      - swFCPortIndex (1)
      - swFCPortType (2)
      - swFCPortPhyState (3)
      - swFCPortOpStatus (4)
      - swFCPortAdmStatus (5)
      - swFCPortLinkState (6)
      - swFCPortTxType (7)
      - swFCPortTxWords (11)
      - swFCPortRxWords (12)
      - swFCPortTxFrames (13)
      - swFCPortRxFrames (14)
      - swFCPortRxC2Frames (15)
      - swFCPortRxC3Frames (16)
      - swFCPortRxCs (17)
      - swFCPortRxMcasts (18)
      - swFCPortTooManyRdys (19)
      - swFCPortNoTxCredits (20)
      - swFCPortRxEncInFrs (21)
      - swFCPortRxCrcs (22)
      - swFCPortRxTruncs (23)
      - swFCPortRxTooLongs (24)
      - swFCPortRxBadEofs (25)
      - swFCPortRxEncOutFrs (26)
      - swFCPortRxBadOs (27)
      - swFCPortC3Discards (28)
      - swFCPortMcastTimedOuts (29)
      - swFCPortTxMcasts (30)
      - swFCPortLipIns (31)
      - swFCPortLipOuts (32)
      - swFCPortLipLastAlpa (33)
      - swFCPortWwn (34)
      - swFCPortSpeed (35)
      - swFCPortName (36)
```

**Figure 42** swFCport hierarchy



```

- swNs (1.3.6.1.4.1.1588.2.1.1.1.7)
  - swNsLocalNumEntry (1)
  - swNsLocalTable (2)
    - swNsLocalEntry (1)
      - swNsEntryIndex (1)
      - swNsPortID (2)
      - swNsPortType (3)
      - swNsPortName (4)
      - swNsPortSymb (5)
      - swNsNodeName (6)
      - swNsNodeSymb (7)
      - swNsIPA (8)
      - swNsIpAddress (9)
      - swNsCos (10)
      - swNsFc4 (11)
      - swNsIpNxPort (12)
      - swNsWwn (13)
      - swNsHardAddr (14)

```

**Figure 43** swNs hierarchy

```

- swEvent (1.3.6.1.4.1.1588.2.1.1.1.8)
  - swEventTrapLevel (1)
  - swEventNumEntries (4)
  - swEventTable (5)
    - swEventEntry (1)
      - swEventIndex (1)
      - swEventTimeInfo (2)
      - swEventLevel (3)
      - swEventRepeatCount (4)
      - swEventDescr (5)

```

**Figure 44** swEvent hierarchy

```

- swFwSystem (1.3.6.1.4.1.1588.2.1.1.1.10)
  - swFwFabricWatchLicense (1)
  - swFwClassAreaTable (2)
    - swFwClassAreaEntry (1)
      - swFwClassAreaIndex (1)
      - swFwWriteThVals (2)
      - swFwDefaultUnit (3)
      - swFwDefaultTimebase (4)
      - swFwDefaultLow (5)
      - swFwDefaultHigh (6)
      - swFwDefaultBufSize (7)
      - swFwCustUnit (8)
      - swFwCustTimebase (9)
      - swFwCustLow (10)
      - swFwCustHigh (11)
      - swFwCustBufSize (12)
      - swFwThLevel (13)
      - swFwWriteActVals (14)
      - swFwDefaultChangedActs (15)
      - swFwDefaultExceededActs (16)
      - swFwDefaultBelowActs (17)
      - swFwDefaultAboveActs (18)
      - swFwDefaultInBetweenActs (19)
      - swFwCustChangedActs (20)
      - swFwCustExceededActs (21)
      - swFwCustBelowActs (22)
      - swFwCustAboveActs (23)
      - swFwCustInBetweenActs (24)
      - swFwValidActs (25)
      - swFwActLevel (26)
  - swFwThresholdTable (3)
    - swFwThresholdEntry (1)
      - swFwThresholdIndex (1)
      - swFwStatus (2)
      - swFwName (3)
      - swFwLabel (4)
      - swFwCurVal (5)
      - swFwLastEvent (6)
      - swFwLastEventVal (7)
      - swFwLastEventTime (8)
      - swFwLastState (9)
      - swFwBehaviorType (10)
      - swFwBehaviorInt (11)
      - swFwLastSeverityLevel (12)

```

**Figure 45** swFwSystem hierarchy

```

- swEndDevice (1.3.6.1.4.1.1588.2.1.1.1.21)
  - swEndDeviceRlsTable (1)
    - swEndDeviceRlsEntry (1)
      - swEndDevicePort (1)
      - swEndDeviceAlpa (2)
      - swEndDevicePortID (3)
      - swEndDeviceLinkFailure (4)
      - swEndDeviceSyncLoss (5)
      - swEndDeviceSigLoss (6)
      - swEndDeviceProtoErr (7)
      - swEndDeviceInvalidWord (8)
      - swEndDeviceInvalidCRC (9)

```

**Figure 46** swEndDevice hierarchy

```

- swGroup (1.3.6.1.4.1.1588.2.1.1.1.22)
  - swGroupTable (1)
    - swGroupEntry (1)
      - swGroupIndex (1)
      - swGroupName (2)
      - swGroupType (3)
  - swGroupMemTable (1)
    - swGroupMemEntry (1)
      - swGroupID (1)
      - swGroupMemWwn (2)
      - swGroupMemPos (3)

```

**Figure 47** swGroup hierarchy

```

- swBlmPerfMnt (1.3.6.1.4.1.1588.2.1.1.1.23)
  - swBlmPerfALPAMntTable (1)
    - swBlmPerfALPAMntEntry (1)
      - swBlmPerfAlpaPort (1)
      - swBlmPerfAlpaIndx (2)
      - swBlmPerfAlpa (3)
      - swBlmPerfAlpaCRCCnt (4)
  - swBlmPerfEEMntTable (2)
    - swBlmPerfEEMntEntry (1)
      - swBlmPerfEEPort (1)
      - swBlmPerfEERefKey (2)
      - swBlmPerfEECRC (3)
      - swBlmPerfEEFCWRx (4)
      - swBlmPerfEEFCWTx (5)
      - swBlmPerfEESid (6)
      - swBlmPerfEEDid (7)
  - swBlmPerfFltMntTable (3)
    - swBlmPerfFltMntEntry (1)
      - swBlmPerfFltPort (1)
      - swBlmPerfFltRefkey (2)
      - swBlmPerfFltCnt (3)
      - swBlmPerfFltAlias (4)

```

**Figure 48** swBlmPerfMnt hierarchy

```

- swTrunk (1.3.6.1.4.1.1588.2.1.1.1.24)
  - swSwitchTrunkable (1)
  - swTrunkTable (2)
    - swTrunkEntry (1)
      - swTrunkPortIndex (1)
      - swTrunkGroupNumber (2)
      - swTrunkMaster (3)
      - swPortTrunked (4)
  - swTrunkGrpTable (3)
    - swTrunkGrpEntry (1)
      - swTrunkGrpNumber (1)
      - swTrunkGrpMaster (2)
      - swTrunkGrpTx (3)
      - swTrunkGrpRx (4)

```

**Figure 49** swTrunk hierarchy

## Text conventions for SW-MIB

The conventions in [Table 11](#) are used for SW-MIB.

**Table 11** SW-MIB text conventions

Type definition	Value	Description
FcWwn	Octet string of size 8	The WWN of HP-specific products and ports.
SwDomainIndex	Integer of size 1 to 239	Fibre Channel domain ID of the switch.
SwNbIndex	Integer of size 1 to 2048	Index of the neighbor interswitch link (ISL) entry.
SwSensorIndex	Integer of size 1 to 1024	Index of the sensor entry.
SwPortIndex	Integer32	Index of the port, starting from 1 up to the maximum number of ports on the HP StorageWorks switch.
SwTrunkMaster	Integer32	Index of the trunk master, starting from 1 up to the maximum number of trunk groups on the HP StorageWorks switch.
SwFwActs	Integer	Valid action matrix: 0swFwNoAction 1swFwErrlog 2swFwSnmpttrap 3swFwErrlogSnmpttrap 4swFwPortloglock 5swFwErrlogPortloglock 6swFwSnmpttrapPortloglock 7swFwErrlogSnmpttrapPortloglock 8swFwRn 9swFwElRn 10swFwStRn 11swFwElStRn 12swFwPIRn 13swFwElPIRn 14swFwStPIRn 15swFwElStPIRn 16swFwMailAlert 17swFwMailAlertErrlog 18swFwMailAlertSnmpttrap 19swFwMailAlertErrlogSnmpttrap 20swFwMailAlertPortloglock 21swFwMailAlertErrlogPortloglock 22swFwMailAlertSnmpttrapPortloglock 23swFwMailAlertErrlogSnmpttrapPortloglock 24swFwMailAlertRn 25swFwElMailAlertRn 26swFwMailAlertStRn 27swFwMailAlertElStRn 28swFwMailAlertPIRn 29swFwMailAlertElPIRn 30swFwMailAlertStPIRn 31swFwMailAlertElStPIRn
SwFwLevels	Integer	Threshold values or action matrix level: 1swFwReserved 2swFwDefault 3swFwCustom

**Table 11** SW-MIB text conventions (continued)

Type definition	Value	Description
SwFwClassesAreas	Integer	Classes and area index: 1swFwEnvTemp 2swFwEnvFan 3swFwEnvPs 4swFwTransceiverTemp 5swFwTransceiverRxp 6swFwTransceiverTxp 7swFwTransceiverCurrent 8swFwPortLink 9swFwPortSync 10swFwPortSignal 11swFwPortPe 12swFwPortWords 13swFwPortCrcs 14swFwPortRXPerf 15swFwPortTXPerf 16swFwPortState 17swFwFabricEd 18swFwFabricFr 19swFwFabricDi 20swFwFabricSc 21swFwFabricZc 22swFwFabricFq 23swFwFabricFl 24swFwFabricGs 25swFwEPortLink 26swFwEPortSync 27swFwEPortSignal 28swFwEPortPe 29swFwEPortWords 30swFwEPortCrcs 31swFwEPortRXPerf 32swFwEPortTXPerf 33swFwEPortState 34swFwFCUPortLink 35swFwFCUPortSync 36swFwFCUPortSignal 37swFwFCUPortPe 38swFwFCUPortWords 39swFwPortCrcs 40swFwFCUPortRXPerf 41swFwFCUPortTXPerf
SwFwWriteVals	Integer	Write-only variable for applying or canceling values or action matrix changes: 1swFwCancelWrite 2swFwApplyWrite
SwFwTimebase	Integer	Timebase for thresholds: 1swFwTbNone 2swFwTbSec 3swFwTbMin 4swFwTbHour 5swFwTbDay
SwFwStatus	Integer	Status for thresholds: 1disabled 2enabled

**Table 11** SW-MIB text conventions (continued)

Type definition	Value	Description
SwFwEvent	Integer	Possible events available: 1started 2changed 3exceeded 4below 5above 6inBetween
SwFwBehavior	Integer	Behavior type for thresholds: 1triggered 2continuous
SwFwState	Integer	State type for last events: 1swFwInformative 2swFwNormal 3swFwfaulty
SwFwLicense	Integer	License state: 1swFwLicensed 2swFwNotLicensed

## sw traps

This section contains descriptions and other information that is specific to sw Traps.

See [Table 12](#) for the descriptions of six traps defined in the SW.MIB, when each trap occurs, and how to configure the trap, if it is possible to do so.

**Table 12** SW MIB traps

Name	Specific	When	How to configure
<a href="#">swFault</a> (not supported)	1	During boot, if diagnostics fail	N.A.
<a href="#">swSensorScn</a>	2	Obsolete	N.A.
<a href="#">swFCPortScn</a>	3	Port changes state	Always on
<a href="#">swEventTrap</a>	4	Switch event	See the <i>HP StorageWorks Fabric OS 5.x command reference guide</i> and the <code>snmpConfig</code> command help page for more information.
<a href="#">swFabricWatchTrap</a>	5	Threshold reached	Fabric OS Command: <code>fwConfigure</code>
<a href="#">swTrackChangesTrap</a>	6	Login/logout	Fabric OS Command: <code>swTrackChanges</code>

See the *HP StorageWorks Fabric OS 5.x command reference guide* and the `snmpMibCapSet` command on how to enable or disable the sending of traps from the various MIBs.

The `swSsn` variable is optional in trap messages. The `swGroupName`, `swGroupType`, and `swGroupMemPos` variables are optional in trap messages in 2.6.x. Each of these optional variables can be set on or off using the `snmpMibCapSet` command.

## swFault

This trap is no longer generated.

Trap #	1
OID	1.3.6.1.4.1.1588.2.1.1.1.0.1
Enterprise	sw
Variables	<a href="#">swDiagResult</a> , <a href="#">swSsn</a>
Description	A swFault (1) is generated whenever the diagnostics detect a fault with the switch. Sample Diagnostics:

#TYPE	Switch is faulty.
#SUMMARY	Faulty reason: %d and SSN is #%
#ARGUMENTS	0, 1
#SEVERITY	Critical
#TIMEINDEX	1
#STATE	Nonoperational

## swSensorScn

(Obsoleted by swFabricWatchTrap)

Trap #	2
OID	1.3.6.1.4.1.1588.2.1.1.1.0.2
Enterprise	sw
Variables	<a href="#">swSensorStatus</a> , <a href="#">swSensorIndex</a> , <a href="#">swSensorType</a> , <a href="#">swSensorValue</a> , <a href="#">swSensorInfo</a> , <a href="#">swSsn</a>
Description	A swSensorScn (2) is generated whenever an environment sensor changes its operational state: for instance, if a fan stops working. The VarBind in the Trap Data Unit contains the corresponding instance of the sensor status, sensor index, sensor type, sensor value (reading), and sensor information. Note that the sensor information contains the type of sensor and its number, in textual format.

#TYPE	A sensor (temperature, fan, or other) changed its operational state.
#SUMMARY	%s: is currently in state %d and SSN is #%
#ARGUMENTS	4, 0, 5
#SEVERITY	Informational
#TIMEINDEX	1
#STATE	Operational

## swFCPortScn

Trap #	3
OID	1.3.6.1.4.1.1588.2.1.1.1.0.3
Enterprise	sw
Variables	<a href="#">swFCPortOpStatus</a> , <a href="#">swFCPortIndex</a> , <a href="#">swFCPortName</a> , <a href="#">swSsn</a>

Description A swFCPortScn (3) is generated whenever an FC\_Port changes its operational state: for instance, when the FC\_Port goes from online to offline. The VarBind in the Trap Data Unit contain the corresponding instance of the FC\_Port's operational status, index, swFCPortName, and swSsn. swFCPortName and swSsn are optional.

```
#TYPE          A Fibre Channel Port changed its operational state.
#SUMMARY       Port Index %d changed state to %d. Port Name: %s and
               SSN is #%.
#ARGUMENTS     1, 0, 2, 3
#SEVERITY      Informational
#TIMEINDEX     1
#STATE         Operational
```

Note Sample trap output for Fabric OS 4.4.0:

```
swFCPortOpStatus.11 = offline(2)
swFCPortIndex.11 = 11
swFCPortName.11 = test
swSsn.0 = none
```

## swEventTrap

Trap # 4  
 OID 1.3.6.1.4.1.1588.2.1.1.1.0.4  
 Enterprise sw  
 Variables [swEventIndex](#), [swEventTimeInfo](#), [swEventLevel](#), [swEventRepeatCount](#), [swEventDescr](#), [swSsn](#)  
 Description This trap is generated when an event occurs with a level that is at or below [swEventTrapLevel](#).

```
#TYPE          A firmware event has been logged.
#SUMMARY       Event %d: %s (severity level %d) - %s SSN is #%.
#ARGUMENTS     0, 1, 2, 4, 5
#SEVERITY      Informational
#TIMEINDEX     1
#STATE         Operational
```

Note Each Trap recipient has a configured severity level association. Whenever an error message is generated at or above that configured severity level the recipient is notified of the event.

This trap is generated for all RASLog messages. From Fabric OS 4.4.0 this trap is generated only for external RASLog messages.

Sample trap output for Fabric OS 4.4.0:

```
swEventIndex.39 = 39
swEventTimeInfo.39 = 2004/08/10-07:00:17
swEventLevel.39 = warning (3)
swEventRepeatCount.39 = 1
swEventDescr.39 = SULB-1001 Firmwaredownload command
has started.
swSsn.0 = none
```



To get details on any event, see the *HP StorageWorks Fabric OS 5.x diagnostics and system error messages reference guide*.

## swFabricWatchTrap

Trap #	5
OID	1.3.6.1.4.1.1588.2.1.1.1.0.5
Enterprise	sw
Variables	<a href="#">swFwClassAreaIndex</a> , <a href="#">swFwThresholdIndex</a> , <a href="#">swFwName</a> , <a href="#">swFwLabel</a> , <a href="#">swFwLastEvent</a> , <a href="#">swFwLastEventVal</a> , <a href="#">swFwLastEventTime</a> , <a href="#">swFwLastState</a> , <a href="#">swSsn</a>
Description	Trap to be sent by Fabric Watch to notify of an event.

#TYPE	Fabric Watch has generated an event.
#SUMMARY	Threshold %s in Class/Area %d at index %d has generated event %d with %d on %s. This event is %d and SSN is #%%s.
#ARGUMENTS	2, 0, 1, 6, 4, 5, 7, 8
#SEVERITY	Warning
#TIMEINDEX	1
#STATE	Operational

Note See the *HP StorageWorks Fabric OS 5.x Fabric Watch administrator guide* for information on setting thresholds in Fabric Watch.

Sample trap output for Fabric OS 4.4.0:

```
swFwClassAreaIndex.1 = swFwEnvTemp(1)
swFwThresholdIndex.1.2 = 2
swFwName.1.2 = envTemp001
swFwLabel.1.2 = Env Temperature 1
swFwLastEventVal.1.2 = 45
swFwLastEventTime.1.2 = 06:17:01 on 08/12/2004
swFwLastEvent.1.2 = inBetween(6)
swFwLastState.1.2 = swFwNormal(2)
swFwLastSeverityLevel.1.2 = 4
swSsn.0 = none
```

## swTrackChangesTrap

Trap #	6
OID	1.3.6.1.4.1.1588.2.1.1.1.0.6
Enterprise	sw
Variables	<a href="#">swTrackChangesInfo</a> , <a href="#">swSsn</a>
Description	Trap to be sent for tracking login/logout/configuration changes.

#TYPE	Track changes has generated a trap.
#SUMMARY	%s and SSN is #%%s
#ARGUMENTS	0, 1
#SEVERITY	Informational
#TIMEINDEX	1
#STATE	Operational

Note Some of the triggers that generate this trap:

- Logout
- Unsuccessful login
- Successful login
- Switch configuration changes
- Track changes on and off

Sample trap output for Fabric OS 4.4.0:

```
swTrackChangesInfo.0 = Logout
swSsn.0 = none
```

This trap gets sent when track-changes is set to ENABLED and is configured to send SNMP traps on track events. Use the `trackchangeset` command to enable the track changes feature and SNMP trap mode.

## swSystem group

This section contains information about the swSystem group.

### swCurrentDate

OID 1.3.6.1.4.1.1588.2.1.1.1.1

Description The current date and time.

Note The return string is displayed, using the following format:

```
ddd MMM DD hh:mm:ss yyyy
```

where:

```
ddd = day
MMM = month
DD = date
hh = hour
mm = minute
ss = seconds
yyyy = year
```

Example:

```
Thu Aug 17 15:16:09 2000
```

### swBootDate

OID 1.3.6.1.4.1.1588.2.1.1.1.2

Description The date and time when the system last booted.

Note The return string is displayed with the following format:

```
ddd MMM DD hh:mm:ss yyyy
```

where:

ddd = day  
MMM = month  
DD = date  
hh = hour  
mm = minute  
ss = seconds  
yyyy = year

Example:

Thu Aug 17 15:16:09 2000

## swFWLastUpdated

OID 1.3.6.1.4.1.1588.2.1.1.1.3

Description The date and time when the firmware was last loaded to the switch.

Note The return string is displayed with the following format:

ddd MMM DD hh:mm:ss yyyy

where:

ddd = day  
MMM = month  
DD = date  
hh = hour  
mm = minute  
ss = seconds  
yyyy = year

Example:

Thu Aug 17 15:16:09 2000

## swFlashLastUpdated

OID 1.3.6.1.4.1.1588.2.1.1.1.4

Description The date and time when the firmware was last downloaded or the configuration file was last changed.

Note The return string is displayed with the following format:

ddd MMM DD hh:mm:ss yyyy

where:

ddd = day  
MMM = month  
DD = date  
hh = hour  
mm = minute  
ss = seconds  
yyyy = year

Example:

Thu Aug 17 15:16:09 2000

## swBootPromLastUpdated

OID	1.3.6.1.4.1.1588.2.1.1.1.1.5
Description	The date and time when the BootPROM was last updated.
Note	The return string is displayed with the following format:

ddd MMM DD hh:mm:ss yyyy

where:

ddd = day  
MMM = month  
DD = date  
hh = hour  
mm = minute  
ss = seconds  
yyyy = year

Example:

Thu Aug 17 15:16:09 2000

## swFirmwareVersion

OID	1.3.6.1.4.1.1588.2.1.1.1.1.6
Description	The current version of the firmware.
Note	The return value is displayed using the following format:

vM.m.f

where:

v = deployment indicator  
M = major version  
m = minor version  
f = software maintenance version

Example:

v4.4.0 (indicating FOS version 4.4.0)

## swOperStatus

OID	1.3.6.1.4.1.1588.2.1.1.1.1.7
Description	The current operational status of the switch. Possible values are: <ul style="list-style-type: none"><li>• online (1): The switch is accessible by an external Fibre Channel port.</li><li>• offline (2): The switch is not accessible.</li><li>• testing (3): The switch is in a built-in test mode and is not accessible by an external Fibre Channel port.</li><li>• faulty (4): The switch is not operational.</li></ul>

## swAdmStatus

OID	1.3.6.1.4.1.1588.2.1.1.1.1.8
Description	<p>The desired administrative status of the switch. A management station might place the switch in a desired state by setting this object accordingly. Possible values are:</p> <ul style="list-style-type: none"><li>• online (1): Set the switch to be accessible by an external FC port.</li><li>• offline (2): Set the switch to be inaccessible.</li><li>• testing (3): Set the switch to run the built-in test.</li><li>• faulty (4): Set the switch to a soft faulty condition.</li><li>• reboot (5): Set the chassis to reboot in 1 second.</li><li>• fastboot (6): Set the chassis to fastboot in 1 second. Fastboot causes the chassis to boot but omit the power-on self test (POST).</li><li>• switchReboot (7): Set the current switch to reboot in 1 second.</li></ul>
Note	<p>When the switch is in faulty state, only two states can be set: faulty and reboot/fastboot/switchReboot.</p> <p>For the SAN Switch 2/32, the testing (3), faulty (4), and switchReboot (7) values are not applicable.</p> <p>For the SAN Switch 4/32, the testing (3), faulty (4), and switchReboot (7) values are not applicable.</p> <p>The switchReboot (7) value applies only to the Core Switch 2/64, SAN Director 2/128, and 4/256 SAN Director.</p>

## swTelnetShellAdmStatus

Note	Applicable to HP Fabric OS 2.x and 3.x only.
OID	1.3.6.1.4.1.1588.2.1.1.1.1.9
Description	<p>The desired administrative status of the telnet shell. Possible values are:</p> <ul style="list-style-type: none"><li>• Unknown (0): The status of the current telnet shell task is unknown.</li><li>• Terminated (1): The current telnet shell task is deleted.</li></ul>
Note	<p>2.x, 3.x: By setting it to 1 (terminated), the current telnet shell task is deleted. When this variable instance is read, it reports the value last set through SNMP.</p> <p>4.x: Not Supported.</p> <p>5.x: Not Supported.</p>

## swSsn

OID	1.3.6.1.4.1.1588.2.1.1.1.1.10
Description	The soft serial number of the switch.
Note	By default, the return value is the WWN of the switch.

## Flash administration

The next six objects are related to firmware or configuration file management. The underlying method in the transfer of the firmware or configuration file is based on either FTP or remote shell. If a password is provided, then FTP is used. If no password is provided, then remote shell is used.

Use one of the two following methods to manage the firmware or switch configuration file in the switch flash.

## Method 1

Set swFlashDLHost.0, swFlashDLUser.0, and swFlashDLFile.0 to appropriate host IP address in dot notation (for example, 192.168.1.7), user name (for example, administrator), and file name of the firmware or configuration file (for example, /home/fcsw/h/v4.4), respectively.

## Method 2

1. Set swFlashDLPassword.0 to an appropriate value (for example, secret) if FTP is the desired method of transfer.
2. Set swFlashDLAdmStatus.0 to 3 (swCfUpload) or 4 (swCfDownload), accordingly.

## swFlashDLOperStatus

OID	1.3.6.1.4.1.1588.2.1.1.1.11
Description	<p>The operational status of the flash. Possible values are:</p> <ul style="list-style-type: none"><li>• unknown (0)</li><li>• swCurrent (1): The flash contains the current firmware image or configuration file.</li><li>• swFwUpgraded (2): The flash contains the image upgraded from the swFlashDLHost.0.</li><li>• swCfUploaded (3): The switch configuration file has been uploaded to the host.</li><li>• swCfDownloaded (4): The switch configuration file has been downloaded from the host.</li><li>• swFwCorrupted (5): The firmware in the flash of the switch is corrupted.</li></ul>

## swFlashDLAdmStatus

Supported in Fabric OS 2.6.x and 3.x only.

OID	1.3.6.1.4.1.1588.2.1.1.1.12
Description	<p>The desired state of the flash.</p> <p>The host is specified in swFlashDLHost.0. In addition, the user name is specified in swFlashDLUser.0 and the file name specified in swFlashDLFile.0. Possible values are:</p> <ul style="list-style-type: none"><li>• swCurrent (1): The flash contains the current firmware image or configuration file.</li><li>• swCfUpload (3): The switch configuration file is to be uploaded to the specified host.</li><li>• swCfDownload (4): The switch configuration file is to be downloaded from the specified host.</li><li>• swFwCorrupted (5): The firmware in the flash is corrupted. This value is for informational purposes only; however, setting swFlashDLAdmStatus to this value is not allowed.</li></ul>
Note	For more information about the configDownload and configUpload commands, see the <i>HP StorageWorks Fabric OS 5.x command reference guide</i> .

## swFlashDLHost

OID	1.3.6.1.4.1.1588.2.1.1.1.13
Description	The name or IP address (in dot notation) of the host to download or upload a relevant file to the flash.

## swFlashDLUser

OID	1.3.6.1.4.1.1588.2.1.1.1.14
Description	The user name is used on the host for downloading or uploading a relevant file, to or from the flash.

### swFlashDLFile

OID	1.3.6.1.4.1.1588.2.1.1.1.1.15
Description	The name of the file to be downloaded or uploaded.

### swFlashDLPassword

OID	1.3.6.1.4.1.1588.2.1.1.1.1.16
Description	The password to be used for FTP transfer of files in the download or upload operation.

### swBeaconOperStatus

OID	1.3.6.1.4.1.1588.2.1.1.1.1.18
Description	<p>The current operational status of the switch beacon. Possible values are:</p> <ul style="list-style-type: none"><li>• On (1): The LEDs on the front panel of the switch run alternately from left to right and right to left. The color is yellow.</li><li>• Off (2): Each LED is in its regular status, indicating color and state.</li></ul>

### swBeaconAdmStatus

OID	1.3.6.1.4.1.1588.2.1.1.1.1.19
Description	<p>The desired status of the switch beacon. Possible values are:</p> <ul style="list-style-type: none"><li>• On (1): The LEDs on the front panel of the switch run alternately from left to right and right to left. Set the color to yellow.</li><li>• Off (2): Set each LED to its regular status, as indicated by its color and state.</li></ul>

### swDiagResult

OID	1.3.6.1.4.1.1588.2.1.1.1.1.20
Description	<p>The result of the POST diagnostics. Possible values are:</p> <ul style="list-style-type: none"><li>• sw-ok (1): The switch is okay.</li><li>• sw-faulty (2): The switch has experienced an unknown fault.</li><li>• sw-embedded-port-fault (3): The switch has experienced an embedded port fault.</li></ul>

### swNumSensors

OID	1.3.6.1.4.1.1588.2.1.1.1.1.21
Description	The number of sensors inside the switch.
Note	For example, the SAN Switch 2/16 value is between 1 and 13 (temperature = 6, fan = 3, power supply = 4). The value might vary depending on the switch model. For Fabric OS 4.x, if no sensor is available, this variable is assigned the value -1.

### swSensorTable

OID	1.3.6.1.4.1.1588.2.1.1.1.1.22
Description	Table of sensor entries.

**Table 13** Sensors on the HP StorageWorks switches

HP StorageWorks Platform	Temperature	Fans	Power Supplies	swNumSensors / connUnitNum Sensors
4/16 SAN Switch	2 sensors	3 fans	1 PS	6
SAN Switch 2/8-EL	3 sensors 2 absent	5 fans 1 absent	2 absent	13 Note: Shows absent entries.
SAN Switch 2/8V	4 sensors	3 fans	1 PS	8
SAN Switch 2/16	3 sensors 2 absent	4 fans 2 absent	2 PS	13 Note: Shows absent entries.
SAN Switch 2/16V	4 sensors	4 fans	2 PS	10
SAN Switch 2/32	5 sensors	6 fans	2 PS	13
SAN Switch 4/32	5 sensors	3 fans	2 PS	10
Core Switch 2/64	10 sensors	3 fans	4 PS	17
SAN Director 2/128	10 sensors	3 fans	4 PS	17
4/256 SAN Director	10 sensors	3 fans	4 PS	17
Brocade 4Gb SAN Switch for HP p-Class BladeSystem	2 temp sensors	N/A	N/A	2 swNumSensors

### swSensorEntry

OID	1.3.6.1.4.1.1588.2.1.1.1.1.22.1
Description	An entry of the sensor information.
Index	swSensorIndex

### swSensorIndex

OID	1.3.6.1.4.1.1588.2.1.1.1.1.22.1.1
Description	The index of the sensor.
Note	The values are 1 through the value in swNumSensors.

### swSensorType

OID	1.3.6.1.4.1.1588.2.1.1.1.1.22.1.2
Description	The type of sensor.



## swSensorStatus

OID	1.3.6.1.4.1.1588.2.1.1.1.1.22.1.3
Description	<p>The current status of the sensor. Valid values for swSensorStatus:</p> <ul style="list-style-type: none"><li>• unknown (1): The status of the sensor is unknown.</li><li>• faulty (2): The status of the sensor is faulty.</li><li>• below-min (3): The sensor value is below the minimal threshold.</li><li>• nominal (4): The status of the sensor is nominal.</li><li>• above-max (5): The sensor value is above the maximum threshold.</li><li>• absent (6): The sensor is missing.</li></ul>
Note	<p>See the following list for valid values:</p> <ul style="list-style-type: none"><li>• For Temperature, valid values include 3 (below-min), 4 (above-max), and 4 (nominal).</li><li>• For Fans, valid values include 3 (below-min), 4 (nominal), and 6 (absent).</li><li>• For Power Supplies valid values include 2 (faulty), 4 (nominal), and 6 (absent).</li></ul>

## swSensorValue

OID	1.3.6.1.4.1.1588.2.1.1.1.1.22.1.4
Description	<p>The current value (reading) of the sensor.</p> <p>The value -2147483648 represents the maximum value of integer value; it also means that the sensor does not have the capability to measure the actual value. In 2.0, the temperature sensor value is in Celsius, the fan value is in RPM (revolutions per minute), and the power supply sensor reading is unknown.</p>
Note	The unknown value -2147483648 indicates the maximum value of integer value.

## swSensorInfo

OID	1.3.6.1.4.1.1588.2.1.1.1.1.22.1.5
Description	Additional information on the sensor. It contains the sensor type and number in textual format; for example, Temp 3 or Fan 6.
Note	Return values for the Core Switch 2/64, SAN Director 2/128, and 4/256 SAN Director depend upon the configuration of your system.

## swTrackChangesInfo

OID	1.3.6.1.4.1.1588.2.1.1.1.1.23
Description	Track changes string; for trap only.
Note	<p>If there are no events to track, the default return value is No event so far.</p> <p>If there are events to track, the following are valid return values:</p> <ul style="list-style-type: none"><li>• Successful login</li><li>• Unsuccessful login</li><li>• Logout</li><li>• Configuration file change from task [<i>name of task</i>]</li><li>• Track-changes on</li><li>• Track-changes off</li></ul>

## swID

Not supported in Fabric OS 3.2.0.

OID 1.3.6.1.4.1.1588.2.1.1.1.1.24

Description The number of the logical switch (either 0 or 1).

## swEtherIPAddress

Not supported in Fabric OS 3.2.0.

OID 1.3.6.1.4.1.1588.2.1.1.1.1.25

Description The IP address of the Ethernet interface of this logical switch.

## swEtherIPMask

Not supported in Fabric OS 3.2.0.

OID 1.3.6.1.4.1.1588.2.1.1.1.1.26

Description The IP mask of the Ethernet interface of this logical switch.

## swFCIPAddress

Not supported in Fabric OS 3.2.0.

OID 1.3.6.1.4.1.1588.2.1.1.1.1.27

Description The IP address of the FC interface of this logical switch.

## swFCIPMask

Not supported in Fabric OS 3.2.0.

OID 1.3.6.1.4.1.1588.2.1.1.1.1.28

Description The IP mask of the FC interface of this logical switch.

## swFabric group

### swDomainID

OID 1.3.6.1.4.1.1588.2.1.1.1.2.1

Description The current Fibre Channel domain ID of the switch. To set a new value, the switch (swAdmStatus) must be in offline or testing state.

### swPrincipalSwitch

OID 1.3.6.1.4.1.1588.2.1.1.1.2.2

Description Indicates whether the switch is the principal switch, yes (1) or no (1), as per FC-SW.

### swNumNbs

OID 1.3.6.1.4.1.1588.2.1.1.1.2.8

Description The number of inter-switch links (ISLs) in the (immediate) neighborhood.

### swNbTable

OID	1.3.6.1.4.1.1588.2.1.1.1.2.9
Description	This table contains the ISLs in the immediate neighborhood of the switch.

### swNbEntry

OID	1.3.6.1.4.1.1588.2.1.1.1.2.9.1
Description	An entry containing the ISL parameters for each neighbor.
Index	swNbIndex

### swNbIndex

OID	1.3.6.1.4.1.1588.2.1.1.1.2.9.1.1
Description	The index for neighborhood entry.

### swNbMyPort

OID	1.3.6.1.4.1.1588.2.1.1.1.2.9.1.2
Description	The port that has an ISL to another switch.
Note	This value is the same as the physical port number of the local switch + 1. The valid values for the Core Switch 2/64, SAN Director 2/128, and 4/256 SAN Director are 1 through the <i>maximum number of ports</i> .

### swNbRemDomain

OID	1.3.6.1.4.1.1588.2.1.1.1.2.9.1.3
Description	The Fibre Channel domain on the other end of the ISL.
Note	The domain ID of the remote switch. Valid values are 1 through 239 as defined by FCS-SW.

### swNbRemPort

OID	1.3.6.1.4.1.1588.2.1.1.1.2.9.1.4
Description	The port index on the other end of the ISL.
Note	The physical port number of the remote switch, plus 1. The valid values for the Core Switch 2/64, SAN Director 2/128, and 4/256 SAN Director are 0 through the <i>maximum number of ports</i> .

## swNbBaudRate

OID	1.3.6.1.4.1.1588.2.1.1.1.2.9.1.5
Description	The baud rate of the ISL. Possible values are: <ul style="list-style-type: none"><li>• other (1): None of the following</li><li>• oneEighth (2): 155 Mbaud</li><li>• quarter (4): 266 Mbaud</li><li>• half (8): 532 Mbaud</li><li>• full (16): 1 Gbaud</li><li>• double (32): 2 Gbaud</li><li>• quadruple (64): 4 Gbaud</li></ul>
Note	The valid values for the Core Switch 2/64, SAN Director 2/128, and 4/256 SAN Director switch are 16 (full) and 32 (double). The valid value for the SAN Switch 4/32 is 64 (quadruple).

## swNbIsIState

OID	1.3.6.1.4.1.1588.2.1.1.1.2.9.1.6
Description	The current state of the ISL.

## swNbIsICost

OID	1.3.6.1.4.1.1588.2.1.1.1.2.9.1.7
Description	The current link cost of the ISL. In other words, the cost of a link to control the routing algorithm.

## swNbRemPortName

OID	1.3.6.1.4.1.1588.2.1.1.1.2.9.1.8
Description	The WWN of the remote port.

## swFabricMemTable

Supported in Fabric OS 2.6.1 and not 3.2.0.

OID	1.3.6.1.4.1.1588.2.1.1.1.2.10
Description	This table contains information on the member switches of a fabric. This might not be available on all versions of Fabric OS.

## swFabricMemEntry

OID	1.3.6.1.4.1.1588.2.1.1.1.2.10.1
Description	An entry containing each switch in the fabric.
Index	swFabricMemWwn

## swFabricMemWwn

OID	1.3.6.1.4.1.1588.2.1.1.1.2.10.1.1
Description	This object identifies the WWN of the member switch.

### swFabricMemDid

OID	1.3.6.1.4.1.1588.2.1.1.1.2.10.1.2
Description	This object identifies the domain ID of the member switch.

### swFabricMemName

OID	1.3.6.1.4.1.1588.2.1.1.1.2.10.1.3
Description	This object identifies the name of the member switch.

### swFabricMemEIP

OID	1.3.6.1.4.1.1588.2.1.1.1.2.10.1.4
Description	This object identifies the Ethernet IP address of the member switch.

### swFabricMemFCIP

OID	1.3.6.1.4.1.1588.2.1.1.1.2.10.1.5
Description	This object identifies the Fibre Channel IP address of the member switch.

### swFabricMemGWIP

OID	1.3.6.1.4.1.1588.2.1.1.1.2.10.1.6
Description	This object identifies the Gateway IP address of the member switch.

### swFabricMemType

OID	1.3.6.1.4.1.1588.2.1.1.1.2.10.1.7
Description	This object identifies the member switch type.

### swFabricMemShortVersion

OID	1.3.6.1.4.1.1588.2.1.1.1.2.10.1.8
Description	This object identifies the Fabric OS version of the member switch.
Note	Provides the short version of the Fabric OS version number. For example, it gives v260 for Fabric OS 2.6.x.

### swIDIDMode

OID	1.3.6.1.4.1.1588.2.1.1.1.2.11
Description	This identifies the status of Insistent Domain ID (IDID) mode. Status indicating whether IDID mode is enabled.

## SW agent configuration group

### swAgtCmtyTable

OID	1.3.6.1.4.1.1588.2.1.1.1.4.11
Description	A table that contains the access control and parameters of the community, one entry for each community.
Note	<p>The table displays all of the community strings (read and write) if it is accessed by the write community string. Only read community strings are displayed if it is accessed by the read community string.</p> <p>In Secure Fabric OS, the community strings can be modified only on the primary switch.</p>

### swAgtCmtyEntry

OID	1.3.6.1.4.1.1588.2.1.1.1.4.11.1
Description	An entry containing the community parameters.
Index	swAgtCmtyIdx

### swAgtCmtyIdx

OID	1.3.6.1.4.1.1588.2.1.1.1.4.11.1.1
Description	The SNMPv1 community entry.
Note	The return value for this entry is 1 through 6.

### swAgtCmtyStr

OID	1.3.6.1.4.1.1588.2.1.1.1.4.11.1.2
Description	This is a community string supported by the agent. If a new value is set successfully, it takes effect immediately.
Note	<p>Default values for communities are as follows:</p> <ul style="list-style-type: none"><li>• 1 (Secret Code)</li><li>• 2 (OrigEquipMfr)</li><li>• 3 (private)</li><li>• 4 (public)</li><li>• 5 (common)</li><li>• 6 (FibreChannel)</li></ul> <p>Community strings 1-3 are read-write and strings 4-6 are read-only.</p> <p>You can change the community setting using the <code>agtCfgSet</code> command.</p>

### swAgtTrapRcp

OID	1.3.6.1.4.1.1588.2.1.1.1.4.11.1.3
Description	The trap recipient associated with the community. If a new value is set successfully, it takes effect immediately.
Note	<p>If not otherwise set, the default IP address for this trap recipient is 0.0.0.0 and the SNMP trap is not sent for the associated community string.</p> <p>With a setting of non-0.0.0.0 IP address, SNMP traps are sent to the host with the associated community string.</p>

Any or all of the trap recipients can be configured to send a trap for the associated community string. The maximum number of trap recipients that can be configured is six. If no trap recipient is configured, no traps are sent.

The trap recipient IP address should be part of the Access Control List for Fabric OS 2.6.1, 3.1, and 4.x (see the `agtCfgSet` command).

### swAgtTrapSeverityLevel

OID	1.3.6.1.4.1.1588.2.1.1.1.4.11.1.4
Description	The trap severity level associated with <a href="#">swAgtTrapRcp</a> . The trap severity level, is set in conjunction with the event's severity level. When an event occurs, if its severity level is at or below the set value, the SNMP trap is sent to configure trap recipients. The severity level is limited to particular events. If a new value is set successfully, it takes effect immediately.
Note	This object obsoletes <a href="#">swEventTrapLevel</a> .

## Fibre Channel port group

This group contains information about the physical state, operational status, performance, and error statistics of each Fibre Channel port on the switch. A Fibre Channel port is one that supports the Fibre Channel protocol, such as F\_Port, E\_Port, U\_Port, or FL\_Port.

### swFCPortCapacity

OID	1.3.6.1.4.1.1588.2.1.1.1.6.1
Description	The maximum number of Fibre Channel ports on this switch. It includes U_Port, F_Port, FL_Port, and any other types of Fibre Channel port.
Note	The valid values are as follows: <ul style="list-style-type: none"><li>• 8 for the SAN Switch 2/8-EL and SAN Switch 2/8V</li><li>• 12 for Brocade 4Gb SAN Switch for HP p-Class BladeSystem</li><li>• 16 for the 4/8 SAN Switch, 4/16 SAN Switch, SAN Switch 2/16, and SAN Switch 2/16V</li><li>• 32 for the SAN Switch 2/32 and SAN Switch 4/32</li><li>• 64 for the Core Switch 2/64</li><li>• 128 for the SAN Director 2/128</li><li>• 256 for the 4/256 SAN Director</li></ul>

### swFCPortTable

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2
Description	A table that contains configuration and service parameters of the port, one entry for each switch port.

### swFCPortEntry

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1
Description	An entry containing the configuration and service parameters of the switch port.
Index	swFCPortIndex

## swFCPortIndex

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.1
Description	The switch port index.
Note	The physical port number of the switch, plus 1. The valid values for the Core Switch 2/64, SAN Director 2/128, and 4/256 SAN Director are 0 through <i>maximum number of ports</i> .

## swFCPortType

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.2
Description	<p>The type of ASIC for the switch port. Possible values are:</p> <ul style="list-style-type: none"><li>• stitch (1)</li><li>• flannel (2)</li><li>• loom (3): HP StorageWorks 1 GB switches</li><li>• bloom (4): SAN Switch 2/8V, SAN Switch 2/16V, SAN Switch 2/32, Core Switch 2/64, and SAN Director 2/128</li><li>• rdbloom (5)</li><li>• wormhole (6)</li><li>• unknown (7): 4/8 SAN Switch, 4/16 SAN Switch, SAN Switch 4/32, 4/256 SAN Director, and Brocade 4Gb SAN Switch for HP p-Class BladeSystem</li></ul>
Note	<p>The valid value for the SAN Switch 2/8V, SAN Switch 2/16V, SAN Switch 2/32, Core Switch 2/64, and SAN Director 2/128 is 4.</p> <p>The valid value for 4/8 SAN Switch, 4/16 SAN Switch, SAN Switch 4/32, 4/256 SAN Director, and Brocade 4Gb SAN Switch for HP p-Class BladeSystem is 7.</p>

## swFCPortPhyState

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.3
Description	<p>The physical state of the port. Possible values are:</p> <ul style="list-style-type: none"><li>• noCard (1): No card is present in this switch slot.</li><li>• noTransceiver (2): No Transceiver module is present in this port (Transceiver is the generic name for gigabit interface converter (GBIC), SFP, and so forth).</li><li>• laserFault (3): The module is signaling a laser fault (defective GBIC).</li><li>• noLight (4): The module is not receiving light.</li><li>• noSync (5): The module is receiving light but is out of sync.</li><li>• inSync (6): The module is receiving light and is in sync.</li><li>• portFault (7): The port is marked faulty (defective GBIC, cable, or device).</li><li>• diagFault (8): The port failed diagnostics (defective G_Port or FL_Port card or motherboard).</li><li>• lockRef (9): The port is locking to the reference signal.</li></ul>

## swFCPortOpStatus

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.4
Description	<p>The operational status of the port. Possible values are:</p> <ul style="list-style-type: none"><li>• Unknown (0): The port module is physically absent.</li><li>• Online (1): User frames can be passed.</li><li>• Offline (2): No user frames can be passed.</li><li>• Testing (3): No user frames can be passed.</li><li>• Faulty (4): The port module is physically faulty.</li></ul>



## swFCPortAdmStatus

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.5
Description	<p>The desired state of the port. A management station might place the port in a desired state by setting this object accordingly. Possible values are:</p> <ul style="list-style-type: none"><li>• Online (1): User frames can be passed.</li><li>• Offline (2): No user frames can be passed.</li><li>• Testing (3): No user frames can be passed.</li><li>• Faulty (4): No user frames can be passed.</li></ul>
Note	<p>For Fabric OS 3.x: The 3 (testing) state indicates that no user frames can be passed. As the result of either explicit management action or per configuration information accessible by the switch, swFCPortAdmStatus is then changed to either the 1 (online) or the 3 (testing) state or remains in the 2 (offline) state.</p> <p>For Fabric OS 4.x: The 3 (testing) state is not supported.</p>

## swFCPortLinkState

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.6
Description	<p>Indicates the link state of the port.</p> <ul style="list-style-type: none"><li>• enabled (1): The port is allowed to participate in the FC-PH protocol with its attached port (or ports, if it is in an FC-AL loop).</li><li>• disabled (2): The port is not allowed to participate in the FC-PH protocol with its attached ports.</li><li>• loopback (3): The port might transmit frames through an internal path to verify the health of the transmitter and receiver path.</li></ul>
Note	When the port's link state changes, its operational status (swFCPortOpStatus) is affected.

## swFCPortTxType

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.7
Description	<p>Indicates the media transmitter type of the port. Possible values are:</p> <ul style="list-style-type: none"><li>• unknown (1): Cannot determine the port driver.</li><li>• lw (2): Long wave laser.</li><li>• sw (3): Short wave laser.</li><li>• ld (4): Long wave LED.</li><li>• cu (5): Copper (electrical).</li></ul>

## swFCPortTxWords

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.11
Description	Counts the number of Fibre Channel words (FCWs) that the port has transmitted.

## swFCPortRxWords

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.12
Description	Counts the number of FCWs that the port has received.

### swFCPortTxFrames

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.13
Description	Counts the number of Fibre Channel frames that the port has transmitted.

### swFCPortRxFrames

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.14
Description	Counts the number of Fibre Channel frames that the port has received.

### swFCPortRxC2Frames

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.15
Description	Counts the number of Class 2 frames that the port has received.

### swFCPortRxC3Frames

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.16
Description	Counts the number of Class 3 frames that the port has received.

### swFCPortRxCs

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.17
Description	Counts the number of link control frames that the port has received.

### swFCPortRxMcasts

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.18
Description	Counts the number of multicast frames that the port has received.

### swFCPortTooManyRdys

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.19
Description	Counts the number of times that RDYs exceed the frames received.

### swFCPortNoTxCredits

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.20
Description	Counts the number of times that the transmit credit has reached 0.

### swFCPortRxEncInFrs

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.21
Description	Counts the number of encoding error or disparity error inside frames received.

### swFCPortRxCrcs

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.22
Description	Counts the number of CRC errors detected for frames received.

### swFCPortRxTruncs

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.23
Description	Counts the number of truncated frames that the port has received.

### swFCPortRxTooLongs

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.24
Description	Counts the number of received frames that are too long.

### swFCPortRxBadEofs

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.25
Description	Counts the number of received frames that have bad EOF delimiters.

### swFCPortRxEncOutFrs

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.26
Description	Counts the number of encoding error or disparity error outside frames received.

### swFCPortRxBadOs

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.27
Description	Counts the number of invalid ordered sets received.

### swFCPortC3Discards

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.28
Description	Counts the number of Class 3 frames that the port has discarded.

### swFCPortMcastTimedOuts

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.29
Description	Counts the number of multicast frames that have been timed out.

### swFCPortTxMcasts

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.30
Description	Counts the number of multicast frames that have been transmitted.

### swFCPortLiplns

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.31
Description	Counts the number of loop initializations that have been initiated by the loop devices that are attached.

## swFCPortLipOuts

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.32
Description	Counts the number of loop initializations that have been initiated by the port.

## swFCPortLipLastAlpa

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.33
Description	Indicates the arbitrated-loop physical address (AL_PA) of the loop device that initiated the last loop initialization.

## swFCPortWwn

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.34
Description	The WWN of the Fibre Channel port. The contents of an instance are in IEEE extended format, as specified in FC-PH.

## swFCPortSpeed

OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.35
Description	The desired baud rate for the port.
Note	The baud rate can be 1 Gbit/sec, 2 Gbit/sec, or 4 Gbit/sec. 4 Gbit/sec is applicable only to the SAN Switch 4/32.

## swFCPortName

Supported in Fabric OS 4.1.x and later.	
OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.36
Description	A string that indicates the name of the addressed port.  The names should be persistent across switch reboots. Port names do not have to be unique within a switch or within a fabric.

## swFCPortSpecifier

Syntax	DisplayString
Access	read-only
Status	current
Description	This string indicates the physical port number of the addressed port.
Note	This string can be entered as argument on CLI commands such as <code>portShow</code> or wherever a physical port number is expected.  The format of the string is: <code>slot/port</code> , where <code>slot</code> is present only for bladed systems.  Example for directors, such as 4/256 SAN Director: <pre>swFCPortSpecifier.64 = 4/15</pre> Example for non-bladed systems, such as SAN Switch 4/32: <pre>swFCPortSpecifier.31 = 31</pre>

## Name server database group

### swNsLocalNumEntry

OID	1.3.6.1.4.1.1588.2.1.1.1.7.1
Description	The number of local Name Server entries.

### swNsLocalTable

OID	1.3.6.1.4.1.1588.2.1.1.1.7.2
Description	The table of local Name Server entries.

### swNsLocalEntry

OID	1.3.6.1.4.1.1588.2.1.1.1.7.2.1
Description	An entry from the local Name Server database.
Index	swNsEntryIndex

### swNsEntryIndex

OID	1.3.6.1.4.1.1588.2.1.1.1.7.2.1.1
Description	The index of the Name Server database entry.

### swNsPortID

OID	1.3.6.1.4.1.1588.2.1.1.1.7.2.1.2
Description	The Fibre Channel port address ID of the entry.

### swNsPortType

OID	1.3.6.1.4.1.1588.2.1.1.1.7.2.1.3
Description	The type of port for this entry. Possible values, as defined in FC-GS-2, are: <ul style="list-style-type: none"><li>unknown (0)</li><li>nPort (1)</li><li>nlPort (2)</li></ul>

### swNsPortName

OID	1.3.6.1.4.1.1588.2.1.1.1.7.2.1.4
Description	The Fibre Channel WWN of the port entry.

### swNsPortSymb

OID	1.3.6.1.4.1.1588.2.1.1.1.7.2.1.5
Description	The contents of a symbolic name of the port entry. In FC-GS-2, a symbolic name consists of a byte array of 1 through 256 bytes, where the first byte of the array specifies the length of its contents. This object variable corresponds to the contents of the symbolic name, with the first byte removed.

### swNsNodeName

OID	1.3.6.1.4.1.1588.2.1.1.1.7.2.1.6
Description	The Fibre Channel WWN of the associated node, as defined in FC-GS-2.

### swNsNodeSymb

OID	1.3.6.1.4.1.1588.2.1.1.1.7.2.1.7
Description	The contents of a Symbolic Name of the node associated with the entry. In FC-GS-2, a Symbolic Name consists of a byte array of 1 through 256 bytes, where the first byte of the array specifies the length of its contents. This object variable corresponds to the contents of the Symbolic Name, with the first byte removed.

### swNsIPa

OID	1.3.6.1.4.1.1588.2.1.1.1.7.2.1.8
Description	The Initial Process Associators of the node for the entry as defined in FC-GS-2.

### swNsIpAddress

OID	1.3.6.1.4.1.1588.2.1.1.1.7.2.1.9
Description	The IP address of the node for the entry as defined in FC-GS-2. The format of the address is in IPv6.

### swNsCos

OID	1.3.6.1.4.1.1588.2.1.1.1.7.2.1.10
Description	The class of services supported by the port.

### swNsFc4

OID	1.3.6.1.4.1.1588.2.1.1.1.7.2.1.11
Description	The FC-4s supported by the port, as defined in FC-GS-2.

### swNsIpNxPort

OID	1.3.6.1.4.1.1588.2.1.1.1.7.2.1.12
Description	The IpAddress of the Nx_Port for the entry.

### swNsWwn

OID	1.3.6.1.4.1.1588.2.1.1.1.7.2.1.13
Description	The WWN of the Fx_Port for the entry.

### swNsHardAddr

OID	1.3.6.1.4.1.1588.2.1.1.1.7.2.1.14
Description	The 24-bit hard address of the node for the entry.

## Event group

Logically, the `swEventTable` is separate from the error log since it is essentially a view of the error log within a particular time window.

### `swEventTrapLevel`

OID	1.3.6.1.4.1.1588.2.1.1.1.8.1
Description	<a href="#">swAgtTrapSeverityLevel</a> , in the absence of <code>swEventTrapLevel</code> , specifies the trap severity level of each defined trap recipient host. This object specifies the <code>swEventTrap</code> level in conjunction with an event's severity level. When an event occurs, and if its severity level is at or below the value specified by the object instance, the agent sends the associated <code>swEventTrap</code> to configured recipients.
Note	This object is obsoleted by <a href="#">swFwLastSeverityLevel</a> and <a href="#">swAgtTrapSeverityLevel</a> .

### `swEventNumEntries`

OID	1.3.6.1.4.1.1588.2.1.1.1.8.4
Description	The number of entries in the event table.
Note	(3.0 only) The value ranges from 0 to 64. (4.0 only) The value ranges from 0 to 255. (4.2 only) The value ranges from 0 to 2048. (4.4 only) The value ranges from 0 to 1024.

### `swEventTable`

OID	1.3.6.1.4.1.1588.2.1.1.1.8.5
Description	The table of event entries.
Note	Only external RAS log messages are supported. Fabric OS 4.4.0 does not have Panic or Debug level messages. All messages are documented in the <i>HP StorageWorks Fabric OS 5.x diagnostics and system error messages reference guide</i> .

### `swEventEntry`

OID	1.3.6.1.4.1.1588.2.1.1.1.8.5.1
Description	An entry of the event table.
Index	<code>swEventIndex</code>

### `swEventIndex`

OID	1.3.6.1.4.1.1588.2.1.1.1.8.5.1.1
Description	The index of the event entry.

## swEventTimeInfo

OID	1.3.6.1.4.1.1588.2.1.1.1.8.5.1.2
Description	The date and time that this event occurred.  The return string is displayed using the following format:  MMM DD hh:mm:ss  where:  MMM = Month DD = Date hh = Hour mm = Minute ss = Seconds  Example: (HP Fabric OS 3.0 only)  Aug 17 15:16:09

## swEventLevel

OID	1.3.6.1.4.1.1588.2.1.1.1.8.5.1.3
Description	The severity level of this event entry. Possible values are: <ul style="list-style-type: none"><li>• Critical (1)</li><li>• Error (2)</li><li>• Warning (3)</li><li>• Informational (4)</li></ul>

## swEventRepeatCount

OID	1.3.6.1.4.1.1588.2.1.1.1.8.5.1.4
Description	If the most recent event is the same as the previous, this number increments by 1, and is the count of consecutive times this particular event has occurred.

## swEventDescr

OID	1.3.6.1.4.1.1588.2.1.1.1.8.5.1.5
Description	A textual description of the event.
Note	For Fabric OS 4.4.0, the format of error messages has changed. This field now uses the message title and number (for example, WEBD-1006) and the message text. Previously this field used the task ID and all the message numbers and message texts. For more information on error messages, see the <i>HP StorageWorks Fabric OS 5.x diagnostics and system error messages reference guide</i> .

## Fabric watch group

The Fabric Watch group contains one license scalar and two tables.

- The scalar, `swFwFabricWatchLicense`, is used to tell if the switch has proper license for Fabric Watch.
- One table, [swFwClassAreaTable](#), contains classArea information such as threshold unit string, time base, low thresholds, and so forth. `SwFwClassAreaEntry` contains control information for a particular class/area's thresholds.



- The other table, [swFwThresholdTable](#), contains individual threshold information such as name, label, last event, and so forth. The thresholds are contained in SwFwThresholdEntry.

### swFwFabricWatchLicense

OID	1.3.6.1.4.1.1588.2.1.1.1.10.1
Description	If the license key is installed on the switch for Fabric Watch, the return value is swFwLicensed; otherwise, the value is swFwNotLicensed.

### swFwClassAreaTable

OID	1.3.6.1.4.1.1588.2.1.1.1.10.2
Description	The table of classes and areas.

### swFwClassAreaEntry

OID	1.3.6.1.4.1.1588.2.1.1.1.10.2.1
Description	An entry of the classes and areas.
Index	swFwClassAreaIndex

### swFwClassAreaIndex

OID	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.1
Description	This index represents the Fabric Watch classArea combination.

### swFwWriteThVals

OID	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.2
Description	This applies or cancels the configuration value changes.
Note	<p>For a read operation, the return value is always swFwCancelWrite. The following custom configuration variables can be modified:</p> <ul style="list-style-type: none"> <li>• swFwCustUnit</li> <li>• swFwCustTimebase</li> <li>• swFwCustLow</li> <li>• swFwCustHigh</li> <li>• swFwCustBufSize</li> </ul> <p>Changes to these custom configuration variables can be saved by setting this variable to swFwApplyWrite; they can be removed by setting this variable to swFwCancelWrite.</p>

### swFwDefaultUnit

OID	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.3
Description	<p>A default unit string name, used to identify the unit of measure for a Fabric Watch classArea combination. For example:</p> <ul style="list-style-type: none"> <li>• C = environment (class), temperature (area).</li> <li>• RPM = environment (class), fan (area).</li> </ul>

### swFwDefaultTimebase

OID	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.4
Description	A default polling period for the Fabric Watch classArea combination. For example: <ul style="list-style-type: none"><li>• swFwTbMin = port (class), link loss (area).</li><li>• swFwTbNone = environment (class), temperature (area).</li></ul>

### swFwDefaultLow

OID	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.5
Description	A default low threshold value.

### swFwDefaultHigh

OID	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.6
Description	A default high threshold value.

### swFwDefaultBufSize

OID	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.7
Description	A default buffer size value.

### swFwCustUnit

OID	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.8
Description	A customizable unit string name, used to identify the unit of measure for a Fabric Watch classArea combination. For example: <ul style="list-style-type: none"><li>• C = environment (class), temperature (area).</li><li>• RPM = environment (class), fan (area).</li></ul>

### swFwCustTimebase

OID	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.9
Description	A customizable polling period for the Fabric Watch classArea combination. For example: <ul style="list-style-type: none"><li>• swFwTbMin = port (class), link loss (area).</li><li>• swFwTbNone = environment (class), temperature (area).</li></ul>

### swFwCustLow

OID	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.10
Description	A customizable low-threshold value for a Fabric Watch classArea combination.

### swFwCustHigh

OID	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.11
Description	A customizable high-threshold value for a Fabric Watch classArea combination.

## swFwCustBufSize

OID	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.12
Description	A customizable buffer size value for a Fabric Watch classArea combination.

## swFwThLevel

OID	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.13
Description	swFwThLevel is used to point to the current level for classArea values. It is either default or custom.
Note	<p>For a read operation, the return value is either 2 (swFwDefault) or 3 (swFwCustom). 1 (swFwReserved) is obsolete.</p> <p>If the write operation sets the variable to 2 (swFwDefault), the following default configuration variables are used for the Fabric Watch classArea combination:</p> <ul style="list-style-type: none"><li>• swFwDefaultUnit</li><li>• swFwDefaultTimebase</li><li>• swFwDefaultLow</li><li>• swFwDefaultHigh</li><li>• swFwDefaultBufSize</li></ul> <p>If the write operation sets the variable to 3 (swFwCustom), the following custom configuration variables are used for the Fabric Watch classArea combination:</p> <ul style="list-style-type: none"><li>• swFwCustUnit</li><li>• swFwCustTimebase</li><li>• swFwCustLow</li><li>• swFwCustHigh</li><li>• swFwCustBufSize</li></ul>

## swFwWriteActVals

OID	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.14
Description	Applies or cancels the alarm value changes.
Note	<p>For a read operation, the return value is always swFwCancelWrite.</p> <p>The following custom alarm variables can be modified:</p> <ul style="list-style-type: none"><li>• swFwCustChangedActs</li><li>• swFwCustExceededActs</li><li>• swFwCustBelowActs</li><li>• swFwCustAboveActs</li><li>• swFwCustInBetweenActs</li></ul> <p>Changes to these custom alarm variables can be saved by setting this variable to swFwApplyWrite.</p> <p>Changes to these custom alarm variables can be removed by setting this variable to swFwCancelWrite.</p>

## swFwDefaultChangedActs

OID	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.15
Description	Default action matrix for changed event.

### swFwDefaultExceededActs

OID	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.16
Description	Default action matrix for an exceeded event. The exceeded value might be either above the high threshold or below the low threshold.

### swFwDefaultBelowActs

OID	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.17
Description	Default action matrix for a below event.

### swFwDefaultAboveActs

OID	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.18
Description	Default action matrix for an above event.

### swFwDefaultInBetweenActs

OID	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.19
Description	Default action matrix for an in-between event.

### swFwCustChangedActs

OID	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.20
Description	Custom action matrix for a changed event.

### swFwCustExceededActs

OID	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.21
Description	Custom action matrix for an exceeded event.

### swFwCustBelowActs

OID	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.22
Description	Custom action matrix for a below event.

### swFwCustAboveActs

OID	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.23
Description	Custom action matrix for an above event.

### swFwCustInBetweenActs

OID	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.24
Description	Custom action matrix for an in-between event.

## swFwValidActs

OID	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.25
Description	Matrix of valid acts for a classArea.

## swFwActLevel

OID	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.26
Description	swFwActLevel is used to point to the current level for classArea values. It is either default or custom.
Note	<p>For a read operation, the return value is either 2 (swFwDefault) or 3 (swFwCustom). 1 (swFwReserved) is obsolete.</p> <p>If the write operation sets the variable to 2 (swFwDefault), the following default action matrix variables are used for the Fabric Watch classArea combination:</p> <ul style="list-style-type: none"><li>• swFwDefaultChangedActs</li><li>• swFwDefaultExceededActs</li><li>• swFwDefaultBelowActs</li><li>• swFwDefaultAboveActs</li><li>• swFwDefaultInBetweenActs</li></ul> <p>If the write operation sets the variable to 3 (swFwCustom), the following custom action matrix variables are used for the Fabric Watch classArea combination:</p> <ul style="list-style-type: none"><li>• swFwCustChangedActs</li><li>• swFwCustExceededActs</li><li>• swFwCustBelowActs</li><li>• swFwCustAboveActs</li><li>• swFwCustInBetweenActs</li></ul>

## swFwThresholdTable

OID	1.3.6.1.4.1.1588.2.1.1.1.10.3
Description	The table of individual thresholds.

## swFwThresholdEntry

OID	1.3.6.1.4.1.1588.2.1.1.1.10.3.1
Description	An entry of an individual threshold.
Index	swFwClassAreaIndex, swFwThresholdIndex

## swFwThresholdIndex

OID	1.3.6.1.4.1.1588.2.1.1.1.10.3.1.1
Description	Represents the element index of a threshold.
Note	<p>For environment class, the indexes are from 2 through <i>number of environment sensors</i>+1. For example, the indexes for environment class temperature area are:</p> <ul style="list-style-type: none"><li>• envTemp001: index of 2</li><li>• envTemp002: index of 3</li><li>• envTemp003: index of 4</li><li>• envTemp004: index of 5</li><li>• envTemp005: index of 6</li></ul> <p>For port-related classes such as E_Port, the indexes are from 1 through <i>number of ports</i>. For example, the indexes for E_Port classlink loss area:</p> <ul style="list-style-type: none"><li>• eportLink000: index of 1</li><li>• eportLink001: index of 2</li><li>• eportLink002: index of 3</li><li>• eportLink003: index of 4</li><li>• eportLink004: index of 5</li><li>• eportLink005: index of 6</li><li>• eportLink006: index of 7</li><li>• eportLink007: index of 8</li><li>• eportLink008: index of 9</li><li>• eportLink009: index of 10</li><li>• eportLink010: index of 11</li><li>• eportLink011: index of 12</li><li>• eportLink012: index of 13</li><li>• eportLink013: index of 14</li><li>• eportLink014: index of 15</li><li>• eportLink015: index of 16</li></ul>

## swFwStatus

OID	1.3.6.1.4.1.1588.2.1.1.1.10.3.1.2
Description	Indicates whether a threshold is enabled or disabled.

## swFwName

OID	1.3.6.1.4.1.1588.2.1.1.1.10.3.1.3
Description	Name of the threshold.
For examples, see <a href="#">Table 14</a> .	

**Table 14** swFwName objects and object types

swFwName objects (swFwName)	Object types (threshold names)
envFan001	Env Fan 1
envPS002	Env Power Supply 2
envTemp001	Env Temperature 1

**Table 14** swFwName objects and object types (continued)

<b>swFwName objects (swFwName)</b>	<b>Object types (threshold names) (continued)</b>
gbicTemp001	GBIC Temperature 1
gbicRXP001	GBIC RX power 1
gbicTXP001	GBIC TX power 1
gbicCrnt001	GBIC Current 1
eportCRCs007	E Port Invalid CRCs 7
eportLink007	E Port Link Failures 7
eportProtoErr007	E Port Protocol Errors 7
eportRXPerf007	E Port RX Performance 7
eportSignal007	E Port Loss of Signal 7
eportState007	E Port State Changes 7
eportSync007	E Port Loss of Sync 7
eportTXPerf007	E Port TX Performance 7
eportWords007	E Port Invalid Words 7
fabricDI000	Fabric Domain ID
fabricED000	Fabric E-port down
fabricFL000	Fabric Fabric login
fabricFQ000	Fabric Fabric<->QL
fabricFR000	Fabric Reconfigure
fabricGS000	Fabric GBIC change 0
fabricSC000	Fabric Segmentation
fabricZC000	Fabric Zoning change
fcuportCRCs013	FCU Port Invalid CRCs 13
fcuportLink013	FCU Port Link Failures 13
fcuportProtoErr013	FCU Port Protocol Errors 13
fcuportRXPerf013	FCU Port RX Performance 13
fcuportSignal013	FCU Port Loss of Signal 13
fcuportState013	FCU Port State Changes 13
fcuportSync013	FCU Port Loss of Sync 13
fcuportTXPerf013	FCU Port TX Performance 13
fcuportWords013	FCU Port Invalid Words 13
portCRCs000 Port Invalid CRCs 0	Port Invalid CRCs 0
portLink000	Port Link Failures 0
portProtoErr000	Port Protocol Errors 0
portRXPerf000	Port RX Performance 0
portSignal000	Port Loss of Signal 0
portState000	Port State Changes 0
portSync000	Port Loss of Sync 0

**Table 14** swFwName objects and object types (continued)

swFwName objects (swFwName)	Object types (threshold names) (continued)
portTXPerf000	Port TX Performance 0
portWords000	Port Invalid Words 0
fopportCRCs013	FOP Port Invalid CRCs 13
fopportLink013	FOP Port Link Failures 13
fopportProtoErr0	FOP Port Protocol Errors 13
fopportRXPerf013	FOP Port RX Performance 13
fopportSignal013	FOP Port Loss of Signal 13
fopportState013	FOP Port State Changes 13
fopportSync013	FOP Port Loss of Sync 13
fopportTXPerf013	FOP Port TX Performance 13
fopportWords013	FOP Port Invalid Words 13

### swFwLabel

OID	1.3.6.1.4.1.1588.2.1.1.1.10.3.1.4
Description	Label of the threshold.
Note	See <a href="#">swFwName</a> .

### swFwCurVal

OID	1.3.6.1.4.1.1588.2.1.1.1.10.3.1.5
Description	Current counter of the threshold.

### swFwLastEvent

OID	1.3.6.1.4.1.1588.2.1.1.1.10.3.1.6
Description	Last event type of the threshold.

### swFwLastEventVal

OID	1.3.6.1.4.1.1588.2.1.1.1.10.3.1.7
Description	Last event value of the threshold.

### swFwLastEventTime

OID	1.3.6.1.4.1.1588.2.1.1.1.10.3.1.8
Description	Last event time of the threshold.
Note	This value is in the same format as in <a href="#">swCurrentDate</a> .

### swFwLastState

OID	1.3.6.1.4.1.1588.2.1.1.1.10.3.1.9
Description	Last event state of the threshold.



### swFwBehaviorType

OID	1.3.6.1.4.1.1588.2.1.1.1.10.3.1.10
Description	A behavior wherein the thresholds generate an event.

### swFwBehaviorInt

OID	1.3.6.1.4.1.1588.2.1.1.1.10.3.1.11
Description	An integer by which the thresholds generate a continuous event.

### swFwLastSeverityLevel

OID	1.3.6.1.4.1.1588.2.1.1.1.10.3.1.12
Description	A last event severity level of the threshold.
Note	This object obsoletes <a href="#">swEventTrapLevel</a> .

## End device group

This section discusses the swEndDevice MIBs.

### swEndDeviceRlsTable

OID	1.3.6.1.4.1.1588.2.1.1.1.21.1
Description	The table of RLS for individual end devices.
Note	By default, no data appears in this table.

### swEndDeviceRlsEntry

OID	1.3.6.1.4.1.1588.2.1.1.1.21.1.1
Description	An entry of an individual end device's RLS.
Index	swEndDevicePort, swEndDeviceAlpa
Note	Since HP StorageWorks switches start with port # 0, the SNMP port # should be the physical port # plus 1. In turn, that means that SNMP port # 3 translates to port # 2.

### swEndDevicePort

OID	1.3.6.1.4.1.1588.2.1.1.1.21.1.1.1
Description	This object represents the port of the local switch to which the end device is connected.

### swEndDeviceAlpa

OID	1.3.6.1.4.1.1588.2.1.1.1.21.1.1.2
Description	This object represents the AL_PA of the end device. SNMP AL_PA number should be the logical AL_PA number plus 1. For example, SNMP AL_PA number 0xf0 translates to 0xef.

### swEndDevicePortID

OID	1.3.6.1.4.1.1588.2.1.1.1.21.1.1.3
Description	The Fibre Channel port address ID of the entry.

### swEndDeviceLinkFailure

OID	1.3.6.1.4.1.1588.2.1.1.1.21.1.1.4
Description	Link failure count for the end device.

### swEndDeviceSyncLoss

OID	1.3.6.1.4.1.1588.2.1.1.1.21.1.1.5
Description	Sync loss count for the end device.

### swEndDeviceSigLoss

OID	1.3.6.1.4.1.1588.2.1.1.1.21.1.1.6
Description	Sig loss count for the end device.

### swEndDeviceProtoErr

OID	1.3.6.1.4.1.1588.2.1.1.1.21.1.1.7
Description	Protocol err count for the end device.

### swEndDeviceInvalidWord

OID	1.3.6.1.4.1.1588.2.1.1.1.21.1.1.8
Description	Invalid word count for the end device.

### swEndDeviceInvalidCRC

OID	1.3.6.1.4.1.1588.2.1.1.1.21.1.1.9
Description	Invalid CRC count for the end device.

## Switch group

Not supported.

### swGroupTable

OID	1.3.6.1.4.1.1588.2.1.1.1.22.1
Description	The table of groups. This might not be available on all versions of Fabric OS.

### swGroupEntry

OID	1.3.6.1.4.1.1588.2.1.1.1.22.1.1
Description	An entry of table of groups.
Index	swGroupIndex

### swGroupIndex

OID	1.3.6.1.4.1.1588.2.1.1.1.22.1.1.1
Description	The group index, starting from 1.

### swGroupName

OID	1.3.6.1.4.1.1588.2.1.1.1.22.1.1.2
Description	The name of the group.

### swGroupType

OID	1.3.6.1.4.1.1588.2.1.1.1.22.1.1.3
Description	The type of the group.

### swGroupMemTable

OID	1.3.6.1.4.1.1588.2.1.1.1.22.2
Description	The table of members of all groups. This might not be available on all versions of the Fabric OS.

### swGroupMemEntry

OID	1.3.6.1.4.1.1588.2.1.1.1.22.2.1
Description	An entry for a member of a group.
Index	swGroupID, swGroupMemWwn

### swGroupID

OID	1.3.6.1.4.1.1588.2.1.1.1.22.2.1.1
Description	This object identifies the Group ID of the member switch.

### swGroupMemWwn

OID	1.3.6.1.4.1.1588.2.1.1.1.22.2.1.2
Description	This object identifies the WWN of the member switch.

### swGroupMemPos

OID	1.3.6.1.4.1.1588.2.1.1.1.22.2.1.3
Description	This object identifies the position of the member switch in the group, based on the order that the switches were added in the group.

## ASIC performance monitoring group

This section discusses the swBlmPerfALPAMnt MIBs.

### swBlmPerfALPAMntTable

OID	1.3.6.1.4.1.1588.2.1.1.1.23.1
Description	AL_PA monitoring counter table.
Note	For the SAN Switch 4/32, 12 filter monitors per port are supported.

### swBlmPerfALPAMntEntry

OID	1.3.6.1.4.1.1588.2.1.1.1.23.1.1
Description	AL_PA monitoring counter for given AL_PA.
Index	swEndDevicePort, swEndDeviceAlpa

### swBlmPerfAlpaPort

OID	1.3.6.1.4.1.1588.2.1.1.1.23.1.1.1
Description	This object identifies the port index of the switch.

### swBlmPerfAlpaIndx

OID	1.3.6.1.4.1.1588.2.1.1.1.23.1.1.2
Description	This object identifies the AL_PA index. There can be 126 AL_PA values.

### swBlmPerfAlpa

OID	1.3.6.1.4.1.1588.2.1.1.1.23.1.1.3
Description	This object identifies the AL_PA values. These values range between x'01' and x'EF' (1 to 239). AL_PA value x'00' is reserved for FL_Port. If Alpha device is invalid, then it will have -1 value.

### swBlmPerfAlpaCRCCnt

OID	1.3.6.1.4.1.1588.2.1.1.1.23.1.1.4
Description	Get CRC count for given AL_PA and port. This monitoring provides information on the number of CRC errors that occurred on the frames destined to each possible AL_PA attached to a specific port.
Note	For the SAN Switch 4/32, this value is always 0. CRC counters are not supported on this platform.

### swBlmPerfEEMntTable

OID	1.3.6.1.4.1.1588.2.1.1.1.23.2
Description	End-to-end monitoring counter table.

### swBlmPerfEEMntEntry

OID	1.3.6.1.4.1.1588.2.1.1.1.23.2.1
Description	End-to-end monitoring counter for given port.
Index	swBlmPerfEEPort, swBlmPerfEERefKey

### swBlmPerfEEPort

OID	1.3.6.1.4.1.1588.2.1.1.1.23.2.1.1
Description	This object identifies the port number of the switch.

### swBlmPerfEERefKey

OID	1.3.6.1.4.1.1588.2.1.1.1.23.2.1.2
Description	This object identifies the reference number of the counter. This reference is a number assigned when a filter is created. In the SNMP Index, start with one instead of 0, add one to the actual reference key.

### swBlmPerfEECRC

OID	1.3.6.1.4.1.1588.2.1.1.1.23.2.1.3
Description	End-to-end CRC error for the frames that matched the SID-DID pair.

### swBlmPerfEEFCWRx

OID	1.3.6.1.4.1.1588.2.1.1.1.23.2.1.4
Description	Receives end-to-end count of FCWs received by the port that matched the SID-DID pair.

### swBlmPerfEEFCWTx

OID	1.3.6.1.4.1.1588.2.1.1.1.23.2.1.5
Description	Receives end-to-end count of FCWs transmitted by the port that matched the SID-DID pair.

### swBlmPerfEESid

OID	1.3.6.1.4.1.1588.2.1.1.1.23.2.1.6
Description	Receives DID information by reference number.

### swBlmPerfEEDid

OID	1.3.6.1.4.1.1588.2.1.1.1.23.2.1.7
Description	Receives SID information by reference number. Source Identifier (SID) is a 3-byte field in the frame header used to indicate the address identifier of the N_Port from which the frame was sent.

### swBlmPerfFltMntTable

OID	1.3.6.1.4.1.1588.2.1.1.1.23.3
Description	Filter-based monitoring counter.

### swBlmPerfFltMntEntry

OID	1.3.6.1.4.1.1588.2.1.1.1.23.3.1
Description	Filter-based monitoring counter for given port.
Index	swBlmPerfFltPort, swBlmPerfFltRefkey

### swBlmPerfFltPort

OID	1.3.6.1.4.1.1588.2.1.1.1.23.3.1.1
Description	Identifies the port number of the switch.

### swBlmPerfFltRefkey

OID	1.3.6.1.4.1.1588.2.1.1.1.23.3.1.2
Description	Identifies the reference number of the filter. This reference number is assigned when a filter is created. In the SNMP Index, start with one instead of 0, add one to actual reference key.

### swBlmPerfFltCnt

OID	1.3.6.1.4.1.1588.2.1.1.1.23.3.1.3
Description	Receives statistics of filter-based monitor. Filter-based monitoring provides information about a filter hit count, such as: <ul style="list-style-type: none"><li>• Read command</li><li>• SCSI or IP traffic</li><li>• SCSI Read/Write</li></ul>

### swBlmPerfFltAlias

OID	1.3.6.1.4.1.1588.2.1.1.1.23.3.1.4
Description	Alias name for the filter.

## Trunking group

### swSwitchTrunkable

OID	1.3.6.1.4.1.1588.2.1.1.1.24.1
Description	Whether the switch supports the trunking feature: no (0) or yes (8).

### swTrunkTable

OID	1.3.6.1.4.1.1588.2.1.1.1.24.2
Description	Displays trunking information for the switch.
Note	For the SAN Switch 4/32, 8 ports per trunk are supported. The SAN Switch 4/32 supports masterless trunking, or dynamic swapping of master port. See the <i>HP StorageWorks Fabric OS 5.x administrator guide</i> for more information on these features.

### swTrunkEntry

OID	1.3.6.1.4.1.1588.2.1.1.1.24.2.1
Description	Entry for the trunking table.
Index	swTrunkPortIndex

### swTrunkPortIndex

OID	1.3.6.1.4.1.1588.2.1.1.1.24.2.1.1
Description	This object identifies the switch port index.
Note	The value of a port index is 1 higher than the port number labeled on the front panel. For example, port index 1 corresponds to port number 0.

### swTrunkGroupNumber

OID	1.3.6.1.4.1.1588.2.1.1.1.24.2.1.2
Description	This object is a logical entity that specifies the group number to which the port belongs. If this value is 0, the port is not trunked.

### swTrunkMaster

OID	1.3.6.1.4.1.1588.2.1.1.1.24.2.1.3
Description	Port number that is the trunk master of the group. The trunk master implicitly defines the group. All ports with the same master are considered to be part of the same group.

### swPortTrunked

OID	1.3.6.1.4.1.1588.2.1.1.1.24.2.1.4
Description	The current state of trunking for a member port: disabled (0) or enabled (1).

### swTrunkGrpTable

OID	1.3.6.1.4.1.1588.2.1.1.1.24.3
Description	Displays trunking performance information for the switch.

### swTrunkGrpEntry

OID	1.3.6.1.4.1.1588.2.1.1.1.24.3.1
Description	Entry for the trunking group table.
Index	swTrunkGrpNumber

### swTrunkGrpNumber

OID	1.3.6.1.4.1.1588.2.1.1.1.24.3.1.1
Description	This object is a logical entity that specifies the group number to which port belongs.

## swTrunkGrpMaster

OID	1.3.6.1.4.1.1588.2.1.1.1.24.3.1.2
Description	This object gives the master port ID for the trunk group.

## swTrunkGrpTx

OID	1.3.6.1.4.1.1588.2.1.1.1.24.3.1.3
Description	Gives the aggregate value of the transmitted words from this trunk group.
Note	The syntax for this MIB variable is an octet string. The output is shown in hexadecimal value. The value of <code>swTrunkGrpTx</code> is the 4-byte word transmitted in the TrunkGrp port. This value can be obtained through the CLI in the output of the <code>portStatsShow</code> command ( <code>stat_wtx</code> value) for the corresponding trunk ports.

## swTrunkGrpRx

OID	1.3.6.1.4.1.1588.2.1.1.1.24.3.1.4
Description	Gives the aggregate value of the received words by this trunk group.
Note	The syntax for this MIB variable is an octet string. The output is shown in hexadecimal value. The value of <code>swTrunkGrpRx</code> is the 4-byte word received in the TrunkGrp port. This value can be obtained through the CLI in the output of the <code>portStatsShow</code> command ( <code>stat_wrx</code> value) for the corresponding trunk ports.



## 6 High-availability MIB objects

This chapter provides descriptions and other information specific to HA-MIB object types and includes the following sections:

- [HA-MIB overview](#) next
- [HA group](#), page 187
- [HA-MIB traps](#), page 191
- [HA-MIB traps and sample triggers](#), page 193

### HA-MIB overview

The HA-MIB provides information about the HA features of Fabric OS 4.x. This MIB is supported only in Fabric OS 4.1.0 and later (and is not supported in Fabric OS 3.x or Fabric OS 2.6.x).

The HA-MIB depends on the SW-MIB. This dependency requires a management application to load the SNMP-FRAMEWORK MIB, then the SW-MIB, and finally the Entity MIB before it can load the HA-MIB.

The descriptions of each of the MIB variables in this chapter come directly from the HA-MIB itself.

The object types in HA-MIB are organized into the following groupings:

- HA Group
- HA-MIB Traps

[Figure 50](#) and [Figure 51](#) show the organization and structure of the HA-MIB file system.

```
- iso (1)
  - org (3)
    - dod (6)
      - internet (1)
        - private (4)
          - enterprises (1)
            - bsci (1588)
              - commDev (2)
                - fibreChannel (1)
                  - haMIB (2)
                    - highAvailability (1)
                    - haMIBTraps (2)
```

**Figure 50** HA-MIB overall tree structure

```

- haMIB (1.3.6.1.4.1.1588.2.1.2)
  - highAvailability (1)
    - haStatus (1)
    - fruTable (5)
      - fruEntry (1)
        - fruClass (1)
        - fruStatus (2)
        - fruObjectNum (3)
        - fruSupplierId (4)
        - fruSupplierPartNum (5)
        - fruSupplierSerialNum (6)
        - fruSupplierRevCode (7)
      - fruHistoryTable (6)
        - fruHistoryEntry (1)
          - fruHistoryIndex (1)
          - fruHistoryClass (2)
          - fruHistoryObjectNum (3)
          - fruHistoryEvent (4)
          - fruHistoryTime (5)
          - fruHistoryPartNum (6)
          - fruHistorySerialNum (7)
    - cpTable (7)
      - cpEntry (1)
        - cpStatus (1)
        - cpIpAddress (2)
        - cpIpMask (3)
        - cpIpGateway (4)
        - cpLastEvent (5)
  - haMIBTraps (2)
    - haMIBTrapPrefix (0)
      - fruStatusChanged (1)
      - cpStatusChanged (2)
      - fruHistoryTrap (3)

```

**Figure 51** haMIB and haMIBTraps hierarchy

Table 15 lists the objects or definitions that are imported into the HA-MIB and the modules from which they are imported.

**Table 15** Objects imported into the HA-MIB

Object/definition	Imported from this module
MODULE-IDENTITY	SNMPv2-SMI
OBJECT-TYPE	
NOTIFICATION-TYPE	
TimeTicks	
Integer32	
IpAddress	
mib-2	
fibrechanel	SW-MIB
entPhysicalIndex	ENTITY-MIB
entPhysicalName	
DisplayString	SNMPv2-TC
TimeStamp	

## HA group

This section describes the MIB objects in the HA group.

### haStatus

OID	1.3.6.1.4.1.1588.2.1.2.1.1
Description	Indicates whether the system is redundant. Possible values are: <ul style="list-style-type: none"><li>• Redundant (0)</li><li>• Nonredundant (1)</li></ul>
Note	Redundant = Dual CP with standby CP ready to take over. Non-redundant = Single/Dual CP system with standby CP not available to take over.

## FRU table

### fruTable

OID	1.3.6.1.4.1.1588.2.1.2.1.5
Description	This table inventories the FRU slots available.
Note	This table contains an entry for each entry in the entPhysicalTable that has entPhysicalClass set to Container (5) and has a child entry having entPhysicalsFRU set to true (1).  In Fabric OS 4.5 and above the chassis is marked as a FRU. Unlike other FRUs the chassis FRU does not have a corresponding container entry.

Table 16 includes information on all FRUs except the chassis.

**Table 16** Valid FRU counts for HP StorageWorks Switches

HP StorageWorks platform	Blades	Fans	Power supplies	WWN card
SAN Switch 2/16	NA	6 fans in 2 FRUs	2 PS	NA
SAN Switch 2/32	NA	6 fans in 3 FRUs	2 PS	NA
SAN Switch 4/32	NA	3 fans in 3 FRUs	2 PS	NA
Core Switch 2/64	8 port blades 2 CP blades	3 fans	4 PS	1 WWN
SAN Director 2/128	8 port blades 2 CP blades	3 fans	2 PS	1 WWN
Brocade 4Gb SAN Switch for HP p-Class BladeSystem	N/A	N/A	N/A	N/A

### fruEntry

OID	1.3.6.1.4.1.1588.2.1.2.1.5.1
Description	An entry for FRU slot in the fruTable.
Index	entPhysicalIndex

## fruClass

OID	1.3.6.1.4.1.1588.2.1.2.1.5.1.1
Description	The type of the FRU object that this slot can hold. Possible values are: <ul style="list-style-type: none"><li>• other (1)</li><li>• unknown (2)</li><li>• chassis (3)</li><li>• cp (4)</li><li>• other-CP (5)</li><li>• switchblade (6)</li><li>• wwn (7)</li><li>• powerSupply (8)</li><li>• fan (9)</li></ul>

## fruStatus

OID	1.3.6.1.4.1.1588.2.1.2.1.5.1.2
Description	The current status of the FRU object in the slot. Possible values are: <ul style="list-style-type: none"><li>• other (1)</li><li>• unknown (2)</li><li>• n (3)</li><li>• off (4)</li><li>• faulty (5)</li></ul>

## fruObjectNum

OID	1.3.6.1.4.1.1588.2.1.2.1.5.1.3
Description	The slot number of the blade, and the unit number for everything else.

## fruSupplierId

OID	1.3.6.1.4.1.1588.2.1.2.1.5.1.4
Description	The supplier ID.

## fruSupplierPartNum

OID	1.3.6.1.4.1.1588.2.1.2.1.5.1.5
Description	The supplier part number.

## fruSupplierSerialNum

OID	1.3.6.1.4.1.1588.2.1.2.1.5.1.6
Description	The supplier serial number.

## fruSupplierRevCode

OID	1.3.6.1.4.1.1588.2.1.2.1.5.1.7
Description	The supplier revision number.

## FRU history table

### fruHistoryTable

OID	1.3.6.1.4.1.1588.2.1.2.1.6
Description	This table gives the contents of the entire history log of the FRU events.

### fruHistoryEntry

OID	1.3.6.1.4.1.1588.2.1.2.1.6.1
Description	An entry in this table represents a particular FRU event.
Index	fruHistoryIndex

### fruHistoryIndex

OID	1.3.6.1.4.1.1588.2.1.2.1.6.1.1
Description	Index of the FRU event in the history table.

### fruHistoryClass

OID	1.3.6.1.4.1.1588.2.1.2.1.6.1.2
Description	The type of the FRU object related to the event: <ul style="list-style-type: none"><li>• other (1)</li><li>• unknown (2)</li><li>• chassis (3)</li><li>• cp (4)</li><li>• other-CP (5)</li><li>• switchblade (6)</li><li>• wwn (7)</li><li>• powerSupply (8)</li><li>• fan (9)</li></ul>

### fruHistoryObjectNum

OID	1.3.6.1.4.1.1588.2.1.2.1.6.1.3
Description	The slot number of the blade and the unit number for everything else.

### fruHistoryEvent

OID	1.3.6.1.4.1.1588.2.1.2.1.6.1.4
Description	The type of the FRU event: <ul style="list-style-type: none"><li>• added (1)</li><li>• removed (2)</li><li>• invalid (3)</li></ul>

## fruHistoryTime

OID	1.3.6.1.4.1.1588.2.1.2.1.6.1.5
Description	The time at which this event happened.

## fruHistoryPartNum

OID	1.3.6.1.4.1.1588.2.1.2.1.6.1.6
Description	The HP part number of the FRU object.

## fruHistorySerialNum

OID	1.3.6.1.4.1.1588.2.1.2.1.6.1.7
Description	The HP serial number of the FRU object.

## Control processor (CP) table

### cpTable

OID	1.3.6.1.4.1.1588.2.1.2.1.7
Description	This table lists all the CPs in the system.

### cpEntry

OID	1.3.6.1.4.1.1588.2.1.2.1.7.1
Description	An entry represents a single CP in the system.
Index	entPhysicalIndex

### cpStatus

OID	1.3.6.1.4.1.1588.2.1.2.1.7.1.1
Description	The current status of the CP: <ul style="list-style-type: none"><li>• other (1)</li><li>• unknown (2)</li><li>• active (3)</li><li>• standby (4)</li><li>• failed (5)</li></ul>

### cpIpAddress

OID	1.3.6.1.4.1.1588.2.1.2.1.7.1.2
Description	The IP address of the Ethernet interface of this CP.

### cpIpMask

OID	1.3.6.1.4.1.1588.2.1.2.1.7.1.3
Description	The IP mask of the Ethernet interface of this CP.

## cplpGateway

OID	1.3.6.1.4.1.1588.2.1.2.1.7.1.4
Description	The IP address of the IP gateway for this CP.

## cpLastEvent

OID	1.3.6.1.4.1.1588.2.1.2.1.7.1.5
Description	<p>The last event related to this CP:</p> <ul style="list-style-type: none"><li>• haSync (1)</li><li>• haOutSync (2)</li><li>• cpFaulty (3)</li><li>• cpHealthy (4)</li><li>• configChange (5)</li><li>• failOverStart (6)</li><li>• failOverDone (7)</li><li>• firmwareCommit (8)</li><li>• firmwareUpgrade (9)</li><li>• other (10)</li><li>• unknown (11)</li></ul>
Note	haSync = HA state on both is in sync; haOutSync = HA state on both is out of sync.

## HA-MIB traps

This section lists the HA-MIB traps.

### fruStatusChanged

OID	1.3.6.1.4.1.1588.2.1.2.2.0.1
Objects	entPhysicalName fruStatus
Status	Current
Description	This trap is sent when the status of any FRU object changes.
Note	<p>Some of the triggers that will generate this trap are:</p> <ul style="list-style-type: none"><li>• switch reboot</li><li>• Add or remove a FRU component</li></ul> <p>Sample trap output for Fabric OS 4.4.0; The following trap is generated when switch is rebooted:</p> <pre>entPhysicalName.11 = MODULE 5 fruStatus.11 = off(4)</pre>

## cpStatusChanged

OID	1.3.6.1.4.1.1588.2.1.2.2.0.2
Objects	cpStatus cpLastEvent swID swSsn
Status	Current
Description	This trap is sent when the status of any CP object changes.
Note	The cpLastEvent variable provides the information about the event that occurred.  Some of the triggers that will generate this trap are: <ul style="list-style-type: none"><li>• Reboot</li><li>• firmwareDownload</li></ul>

Sample trap output for Fabric OS 4.4.0:

```
cpStatus.13 = standby(4)
cpLastEvent.13 = cpHealthy(6)
swID.0 = 1
swSsn.0 = 10:00:00:60:69:e2:03:6d
```

## fruHistoryTrap

OID	1.3.6.1.4.1.1588.2.1.2.2.0.3
Objects	fruHistoryClass fruHistoryObjectNum fruHistoryEvent fruHistoryTime fruHistoryPartNum fruHistorySerialNum
Status	Current
Description	This trap is sent when an FRU is added or removed.
Note	The trigger that generates this trap is: Add or remove a FRU component.

Sample trap output for Fabric OS 4.4.0:

```
fruHistoryClass.40 = powerSupply(8)
fruHistoryObjectNum.40 = 2
fruHistoryEvent.40 = removed(2)
fruHistoryTime.40 = Fri Aug 13 07:24:00 2004
fruHistoryFactoryPartNum.40 = 23-0000006-02
fruHistoryFactorySerialNum.40 = FL2L0022715
```



## HA-MIB traps and sample triggers

Table 17 lists the HA-MIB traps and sample events that will trigger them.

**Table 17** HA-MIB traps and examples of triggers

HA-MIB traps	Trigger
fruStatusChanged	Examples of events that will trigger this trap: <ul style="list-style-type: none"><li>• Switch reboot</li><li>• Add or remove a FRU component</li></ul>
cpStatusChanged	Examples of events that will trigger this trap: <ul style="list-style-type: none"><li>• Reboot</li><li>• firmwareDownload</li></ul>
fruHistoryTrap	Examples of events that will trigger this trap: <ul style="list-style-type: none"><li>• Add or remove a FRU component</li></ul>



## 7 FICON MIB objects

 **NOTE:** FICON is not supported on HP B-Series Fibre Channel switches. The FICON information in this document is included for reference only.

This chapter provides descriptions and other information specific to FICON MIB (LINK-INCIDENT-MIB) object types, including the following information:

- [FICON MIB overview](#) next
- [ficonRNID group](#), page 199
- [ficonLIRR group](#), page 203
- [ficonRLIR group](#), page 205
- [linkIncidentMIBTraps group](#), page 207

### FICON MIB overview

The FICON MIB module (LINK-INCIDENT-MIB) defines support for FICON in Fabric OS 4.1.2 and later. This MIB addresses link incident and link failure data for FICON hosts and devices connected to an HP StorageWorks switch.

The descriptions of each of the MIB variables in this chapter come directly from the FICON MIB itself.

The object types in the FICON MIB are organized into the following groupings:

- Request Node Identification Data (RNID)
- Link Incident Record Registration (LIRR)
- Registered Link Incident Report (RLIR)
- Traps

### SNMP traps for FICON

SNMP traps for FICON are generated when:

- A FICON device is added to the switch.
- A FICON device is removed from the switch.
- A new listener is added (once the LIRR handshake is complete).
- A listener entry is deleted.
- A link incident occurs.

### FICON MIB system organization of MIB objects

[Figure 52](#) through [Figure 54](#) show the organization and structure of the FICON MIB file system.

```
- iso (1)
  - org (3)
    - dod (6)
      - internet (1)
        - private (4)
          - enterprises (1)
            - bsci (1588)
              - commDev (2)
                - fibreChannel (1)
                  - fcSwitch (1)
                    - linkIncidentMIB (50)
                      - ficonRNID (2)
                      - ficonLIRR (3)
                      - ficonRLIR (4)
                      - linkIncidentMIBTraps (21)
```

**Figure 52** Overall tree structure for FICON MIB (linkIncidentMIB)

```

- linkIncidentMIB (1.3.6.1.4.1.1588.2.1.1.50)
  - nodeRNIDTable (2)
    - nodeRNIDEntry (1)
      - nodeRNIDIndex (1)
      - nodeRNIDIncidentPortWWN (2)
      - nodeRNIDPID (3)
      - nodeRNIDFlags (4)
      - nodeRNIDType (5)
      - nodeRNIDModel (6)
      - nodeRNIDManufacturer (7)
      - nodeRNIDManufacturerPlant (8)
      - nodeRNIDSequenceNumber (9)
      - nodeRNIDConnectedPortWWN (10)
      - nodeRNIDPortType (11)
      - nodeRNIDFormat (12)
      - nodeRNIDTag (13)
      - nodeRNIDParams (14)
    - switchRNIDTable (4)
      - switchRNIDEntry (1)
        - (1)
        - switchRNIDSwitchWWN (2)
        - switchRNIDFlags (3)
        - switchRNIDType (4)
        - switchRNIDModel (5)
        - switchRNIDManufacturer (6)
        - switchRNIDManufacturerPlant (7)
        - switchRNIDSequenceNumber (8)
        - switchRNIDTag (9)
        - switchRNIDParams (10)
    - LIRTable (2)
      - LIREntry (1)
        - LIRIndex (1)
        - LIRListenerPortWWN (2)
        - LIRListenerPID (3)
        - LIRRegType (4)
        - LIRProtocol (5)
        - LIRPortType (6)
        - LIRFormat (7)
    - rLIRTable (2)
      - rLIREntry (1)
        - (1)
        - rLIRIncidentPortWwn (2)
        - rLIRIncidentNodeWwn (3)
        - rLIRIncidentPortType (5)
        - rLIRIncidentPID (6)
        - rLIRIncidentPortNumber (7)
        - rLIRConnectedPortWwn (8)
        - rLIRConnectedNodeWwn (9)
        - rLIRFabricWwn (10)
        - rLIRLinkFailureType (11)
        - rLIRTimeStamp (12)
        - rLIRFormat (13)

```

**Figure 53** linkIncidentMIB hierarchy

```

- linkIncidentMIBTraps (21)
  - linkIncidentMIBTrapPrefix (0)
    - linkRNIDDeviceRegistration (1)
    - linkRNIDDeviceDeRegistration (2)
    - linkLIRListenerAdded (3)
    - linkLIRListenerRemoved (4)
    - linkRLIRFailureIncident (5)

```

**Figure 54** linkIncidentMIBTraps hierarchy

## Definitions for FICON MIB

Table 18 lists the objects and definitions that are imported into the FICON MIB and the modules from which they are imported.

**Table 18** Objects and imported into the FICON MIB

Object/definition	Module imported from
MODULE-IDENTITY	SNMPv2-SMI
OBJECT-TYPE	
Integer32	
NOTIFICATION-TYPE	
TEXTUAL-CONVENTION	SNMPv2-TC
DisplayString	
fcSwitch	HP-REG-MIB

## Textual conventions


Table 19 lists the text conventions for the FICON MIB.

**Table 19** FICON MIB text conventions

Name	Status	Description	Syntax
LIRRProtocol	Current	Represents the LIRR Protocol.	INTEGER { fcP (1), sb2 (2) }
FcPortID	Current	Represents Fibre Channel Address ID, a 24-bit value unique within the address space of a fabric.	OCTET STRING (SIZE (3))
RNIDModel	Current	Represents the value of Model Number.	OCTET STRING (SIZE (3))
RLIRLinkFailureType	Current	Represents the link failure type.	INTEGER { bitErrorRate(2), lossOfSignal(3), nOSRecognized(4), primitiveSequenceTimeout(5), invalidSeqForPortState(6), loopInitializationTimeout(7), lossOfSignalInLoopInit(8) }
RNIDManufacturer	Current	Represents the Manufacturer's name or code.	OCTET STRING (SIZE (3))
RNIDTagType	Current	Represents the value of RNID Tag, in hexadecimal format	OCTET STRING (SIZE (2))
LinkWwn	Current	Represents the link WWN.	OCTET STRING (SIZE (8))

**Table 19** FICON MIB text conventions (continued)

Name	Status	Description	Syntax
RegType	Current	Represents the RNID Registration Type.	INTEGER { conditional (1), unconditional (2) }
RNIDSequenceNumber	Current	Sequence number of the self describing node.	OCTET STRING (SIZE (12))
RNIDManufacturerPlant	Current	Represents the manufacturer's plant name or code.	OCTET STRING (SIZE (2))
RNIDParams	Current	Represents the value of Param.	OCTET STRING (SIZE (3))
PortType	Current	Represents the Port Type.	INTEGER { n-port (1), nl-port (2) }
RNIDFlags	Current	Represents the value of RNID Flag in hexadecimal format. It indicates whether the node is valid, not valid, or current.	OCTET STRING (SIZE (1))
LinkFormat	Current	Represents the frame format.	INTEGER { ficon (1), common (2) }
RNIDType	Current	Represents the value of Type Number. Displays the type number of the self-describing node. It also describes the machine type.	OCTET STRING (SIZE (6))

 **NOTE:** RNIDTagType includes DISPLAY-HINT x.

## ficonRNID group

This group contains all RNID group objects for FICON.

### nodeRNIDTableNumEntries

OID 1.3.6.1.4.1.1588.2.1.1.50.2.1

Description The number of entries in an RNID table.

Note See the `ficonShow` command help page for additional information on FICON MIB tables.

### nodeRNIDTable

OID 1.3.6.1.4.1.1588.2.1.1.50.2.2

Description A table that contains one entry for each FICON RNID node attached to a switch.

## nodeRNIDEntry

OID	1.3.6.1.4.1.1588.2.1.1.50.2.2.1
Description	An entry containing the RNID information for a FICON node (see <a href="#">Table 20</a> ).
Index	nodeRNIDIndex

## nodeRNIDIndex

**Table 20** NodeRNIDEntry objects and object types

NodeRNIDEntry object	Object type
nodeRNIDIndex	Integer32
nodeRNIDIncidentPortWWN	LinkWwn
nodeRNIDPID	FcPortID
nodeRNIDFlags	Integer32
nodeRNIDProtocol	Integer32
nodeRNIDClass	RNIDClass
nodeRNIDPort	Integer32
nodeRNIDType	Octet string (6)
nodeRNIDModel	Octet string (3)
nodeRNIDManufacturer	Octet string (3)
nodeRNIDManufacturerPlant	Octet string (2)
nodeRNIDSequenceNumber	Octet string (12)
nodeRNIDConnectedPortWWN	LinkWwn
nodeRNIDPortType	PortType
nodeRNIDFormat	LinkFormat
nodeRNIDTag	Octet string (2)

OID	1.3.6.1.4.1.1588.2.1.1.50.2.2.1.1
Description	Index into the nodeRNIDTable.

## nodeRNIDIncidentPortWWN

OID	1.3.6.1.4.1.1588.2.1.1.50.2.2.1.2
Description	Port WWN for Incident port. An N_Port (FICON device or host) is an incident port.

## nodeRNIDPID

OID	1.3.6.1.4.1.1588.2.1.1.50.2.2.1.3
Description	PID for an Incident port.

## nodeRNIDFlags

OID	1.3.6.1.4.1.1588.2.1.1.50.2.2.1.4
Description	RNID flags for an Incident port. Bits 0–2 of the flag describe the validity of bits 3–7 of the flag. Bit 3 of the flag specifies whether the node is a device-type node or a central-processor-complex-type (CPC-type) node. Bits 4–7 of the flag are reserved.



### nodeRNIDType

OID	1.3.6.1.4.1.1588.2.1.1.50.2.2.1.5
Description	Number associated with a node.

### nodeRNIDModel

OID	1.3.6.1.4.1.1588.2.1.1.50.2.2.1.6
Description	Model number of the RNID node.

### nodeRNIDManufacturer

OID	1.3.6.1.4.1.1588.2.1.1.50.2.2.1.7
Description	The manufacturer of the node.

### nodeRNIDManufacturerPlant

OID	1.3.6.1.4.1.1588.2.1.1.50.2.2.1.8
Description	The manufacturer plant of the node.

### nodeRNIDSequenceNumber

OID	1.3.6.1.4.1.1588.2.1.1.50.2.2.1.9
Description	The sequence number of the node.

### nodeRNIDConnectedPortWWN

OID	1.3.6.1.4.1.1588.2.1.1.50.2.2.1.10
Description	WWN of the connected port.

### nodeRNIDPortType

OID	1.3.6.1.4.1.1588.2.1.1.50.2.2.1.11
Description	Port type (N, NL, or virtual port) of the connected port.

### nodeRNIDFormat

OID	1.3.6.1.4.1.1588.2.1.1.50.2.2.1.12
Description	Node identification data format of the connected port.

### nodeRNIDTag

OID	1.3.6.1.4.1.1588.2.1.1.50.2.2.1.13
Description	Node identification tag of the connected port.

## nodeRNIDParams

OID	1.3.6.1.4.1.1588.2.1.1.50.2.2.1.14
Description	Node parameters of the connected port.

## switchRNIDTableNumEntries

OID	1.3.6.1.4.1.1588.2.1.1.50.2.3
Description	The number of entries in an RNID table that corresponds to the switch.
Note	See the <code>ficonShow</code> command help page for additional information on FICON MIB tables.

## switchRNIDTable

OID	1.3.6.1.4.1.1588.2.1.1.50.2.4
Description	A table that contains RNID information for each switch FICON node.

## switchRNIDEntry

OID	1.3.6.1.4.1.1588.2.1.1.50.2.4.1
Description	An entry containing the RNID information for the switch FICON node (see <a href="#">Table 21</a> ).

**Table 21** SwitchRNIDEntry objects and object types

SwitchRNIDEntry object	Object type
switchRNIDIndex	Integer32
switchRNIDSwitchWWN	LinkWwn
switchRNIDSerialNumber	Octet string (14)
switchRNIDPartNumber	Octet string (12)
switchRNIDDomainID	Integer32

## switchRNIDIndex

OID	1.3.6.1.4.1.1588.2.1.1.50.2.4.1.1
Description	Index into switchRNIDTable.

## switchRNIDSwitchWWN

OID	1.3.6.1.4.1.1588.2.1.1.50.2.4.1.2
Description	WWN of the switch.

## switchRNIDFlags

OID	1.3.6.1.4.1.1588.2.1.1.50.2.4.1.3
Description	RNID flags for the switch.

### switchRNIDType

OID	1.3.6.1.4.1.1588.2.1.1.50.2.4.1.4
Description	Type Number associated with the switch.

### switchRNIDModel

OID	1.3.6.1.4.1.1588.2.1.1.50.2.4.1.5
Description	Model number of the RNID switch.

### switchRNIDManufacturer

OID	1.3.6.1.4.1.1588.2.1.1.50.2.4.1.6
Description	The manufacturer of the switch.

### switchRNIDManufacturerPlant

OID	1.3.6.1.4.1.1588.2.1.1.50.2.4.1.7
Description	The manufacturer plant of the switch.

### switchRNIDSequenceNumber

OID	1.3.6.1.4.1.1588.2.1.1.50.2.4.1.8
Description	The sequence number of the switch.

### switchRNIDTag

OID	1.3.6.1.4.1.1588.2.1.1.50.2.4.1.9
Description	The tag of the switch.

### switchRNIDParams

OID	1.3.6.1.4.1.1588.2.1.1.50.2.4.1.10
Description	The parameters of the switch.

## ficonLIRR group

This group contains all LIRR group objects for FICON.

### LIRRTblNumEntries

OID	1.3.6.1.4.1.1588.2.1.1.50.3.1
Description	The number of entries in an LIRR table.
Note	See the <code>ficonShow</code> command help page for additional information on FICON MIB tables.

## LIRRTable

OID	1.3.6.1.4.1.1588.2.1.1.50.3.2
Description	A table that contains LIRR information, one entry for each LIRR incident for an attached FICON device.

## LIRREntry

OID	1.3.6.1.4.1.1588.2.1.1.50.3.2.1
Description	An entry containing LIRR information (see <a href="#">Table 22</a> ).

**Table 22** LIRREntry objects and object types

LIRREntry object	Object type
LIRRIndex	Integer32
LIRRListnerPortWWN	LinkWwn
LIRRListenerPID	FcPortID
LIRRRegType	RegType
LIRRProtocol	LIRRProtocol
LIRRPoType	PortType
LIRRFormat	LinkFormat

## LIRRIndex

OID	1.3.6.1.4.1.1588.2.1.1.50.3.2.1.1
Description	Index into the LIRR table.

## LIRRListnerPortWWN

OID	1.3.6.1.4.1.1588.2.1.1.50.3.2.1.2
Description	WWN of the Listener port.

## LIRRListenerPID

OID	1.3.6.1.4.1.1588.2.1.1.50.3.2.1.3
Description	PID for the Listener port.

## LIRRRegType

OID	1.3.6.1.4.1.1588.2.1.1.50.3.2.1.4
Description	Registration type: conditional or unconditional.

## LIRRProtocol

OID	1.3.6.1.4.1.1588.2.1.1.50.3.2.1.5
Description	Protocol type supported.

## LIRPortType

OID	1.3.6.1.4.1.1588.2.1.1.50.3.2.1.6
Description	Attached port type.

## LIRFormat

OID	1.3.6.1.4.1.1588.2.1.1.50.3.2.1.7
Description	Registration type: conditional or unconditional.

## ficonRLIR group

This group contains all RLIR group objects for FICON.

### rLIRTableNumEntries

OID	1.3.6.1.4.1.1588.2.1.1.50.4.1
Description	The number of entries in a switch RLIR table.
Note	See the <code>ficonShow</code> command help page for additional information on FICON MIB tables.

### rLIRTable

OID	1.3.6.1.4.1.1588.2.1.1.50.4.2
Description	A table that contains RLIR information, one entry for each LIRR incident for an attached FICON device.

### rLIREntry

OID	1.3.6.1.4.1.1588.2.1.1.50.4.2.1
Description	An entry containing RLIR information (see <a href="#">Table 23</a> ).

**Table 23** RLIREntry objects and object types

RLIREntry object	Object type
IIRIndex	Integer32
IIRListenerPortWWN	LinkWwn
IIRListenerPID	FcPortID
IIRRegType	RegType
IIRProtocol	LIRRProtocol
IIRPortType	PortType
IIRFormat	LinkFormat
IIRIndex	Integer32
IIRListenerPortWWN	LinkWwn
IIRListenerPID	FcPortID
IIRRegType	RegType
IIRProtocol	LIRRProtocol

## rLIRIndex

OID	1.3.6.1.4.1.1588.2.1.1.50.4.2.1.1
Description	Index into the RLIR table.

## rLIRIncidentPortWwn

OID	1.3.6.1.4.1.1588.2.1.1.50.4.2.1.2
Description	Port WWN for RLIR Incident port.

## rLIRIncidentNodeWwn

OID	1.3.6.1.4.1.1588.2.1.1.50.4.2.1.3
Description	Incident node WWN.

## rLIRIncidentPortType

OID	1.3.6.1.4.1.1588.2.1.1.50.4.2.1.5
Description	RLIR Incident port type.

## rLIRIncidentPID

OID	1.3.6.1.4.1.1588.2.1.1.50.4.2.1.6
Description	RLIR Incident PID.

## rLIRIncidentPortNumber

OID	1.3.6.1.4.1.1588.2.1.1.50.4.2.1.7
Description	RLIR Incident port number. This is a vendor-specific port number.

## rLIRConnectedPortWwn

OID	1.3.6.1.4.1.1588.2.1.1.50.4.2.1.8
Description	RLIR Connected port WWN.

## rLIRConnectedNodeWwn

OID	1.3.6.1.4.1.1588.2.1.1.50.4.2.1.9
Description	RLIR Connected node WWN.

## rLIRFabricWwn

OID	1.3.6.1.4.1.1588.2.1.1.50.4.2.1.10
Description	RLIR Fabric WWN.

## rLIRLinkFailureType

OID	1.3.6.1.4.1.1588.2.1.1.50.4.2.1.11
Description	RLIR Link failure type.

## rLIRTimeStamp

OID	1.3.6.1.4.1.1588.2.1.1.50.4.2.1.12
Description	RLIR time stamp.

## rLIRFormat

OID	1.3.6.1.4.1.1588.2.1.1.50.4.2.1.13
Description	RLIR Format.

## linkIncidentMIBTraps group

### linkIncidentMIBTrapPrefix

OID	1.3.6.1.4.1.1588.2.1.1.50.21.0
Description	The Link Incident traps.

### linkRNIDDeviceRegistration

Trap#	1
OID	1.3.6.1.4.1.1588.2.1.1.50.21.0.1
Enterprise	sw
Variables	<a href="#">nodeRNIDIndex</a> , <a href="#">nodeRNIDIncidentPortWWN</a> , <a href="#">nodeRNIDConnectedPortWWN</a>
Description	A device registered with the switch.

### linkRNIDDeviceDeRegistration

Trap#	2
OID	1.3.6.1.4.1.1588.2.1.1.50.21.0.2
Enterprise	sw
Variables	<a href="#">nodeRNIDIndex</a> , <a href="#">nodeRNIDIncidentPortWWN</a> , <a href="#">nodeRNIDConnectedPortWWN</a>
Description	A device deregistered from the switch.

### linkLIRListenerAdded

Trap#	3
OID	1.3.6.1.4.1.1588.2.1.1.50.21.0.3
Enterprise	sw
Variables	<a href="#">LIRListenerPortWWN</a> , <a href="#">LIRListenerPID</a> , <a href="#">LIRIndex</a>
Description	A listener for link failure incident has been added.

## linkLIRListenerRemoved

Trap#	4
OID	1.3.6.1.4.1.1588.2.1.1.50.21.0.4
Enterprise	sw
Variables	<a href="#">LIRListenerPortWWN</a> , <a href="#">LIRListenerPID</a> , <a href="#">LIRIndex</a>
Description	A listener for link failure incident has been removed.

## linkRLIRFailureIncident

Trap#	5
OID	1.3.6.1.4.1.1588.2.1.1.50.21.0.5
Enterprise	sw
Variables	<a href="#">nodeRNIDIndex</a> , <a href="#">LIRIndex</a> , <a href="#">rLIRIncidentPortWwn</a> , <a href="#">rLIRConnectedPortWwn</a> , , <a href="#">rLIRLinkFailureType</a> , <a href="#">LIRListenerPID</a>
Description	A link failure incident has occurred. If there is no listener for incident, the value of LIRIndex wis -2147483647 and LIRListenerPID is 0.



---

## 8 FibreAlliance MIB objects

This chapter contains descriptions and other information specific to FA MIB (FCMGMT-MIB) object types, including the following:

- [FA MIB overview](#) next
- [ConnSet group](#), page 216
- [Statistics group](#), page 241
- [Service group](#), page 250
- [SNMP trap registration group](#), page 252
- [Revision number scalar](#), page 254
- [Unsupported tables](#), page 254
- [Unsupported traps](#), page 255

### FA MIB overview

The descriptions of each of the MIB variables in this chapter come directly from the FCMGMT-MIB itself. The notes that follow the descriptions are typically HP-specific information.

The object types in FCMGMT-MIB are organized into the following groups:

- Connectivity
- Trap Registration
- Revision Number
- Statistic Set
- Service Set

### FCMGMT-MIB system organization of MIB objects

[Figure 55](#) to [Figure 65](#) depicts the high level organization of the FCMGMT-MIB.

```

- iso (1)
  - org (3)
    - dod (6)
      - internet (1)
        - experimental (3)
          - fcmgmt (94)
            - connSet (1)
              - uNumber (1)
              - systemURL (2)
              - StatusChangeTime (3)
              - ConfigurationChangeTime (4)
              - ConnUnitTableChangeTime (5)
              + connUnitTable (6)
              + connUnitRevsTable (7)
              + connUnitSensorTable (8)
              + connUnitPortTable (10)
              + connUnitEventTable (11)
              + connUnitLinkTable (12)
            - trapReg (2)
              - trapMaxClients (1)
              - trapClientCount (2)
              + trapRegTable (3)
            - revisionNumber (3)
            - statSet (4)
              + connUnitPortStatTable (1)
            - connUnitServiceSet (5)
              + connUnitServiceScalars (1)
              + connUnitServiceTables (2)

```

**Figure 55** FCMGMT-MIB high level hierarchy

```

- connUnitTable (6)
  - connUnitEntry (1)
    - connUnitId (1)
    - connUnitGlobalId (2)
    - (3)
    - connUnitNumports (4)
    - connUnitState (5)
    - connUnitStatus (6)
    - connUnitProduct (7)
    - connUnitSn (8)
    - connUnitUpTime (9)
    - connUnitUrl (10)
    - connUnitDomainId (11)
    - connUnitProxyMaster (12)
    - connUnitPrincipal (13)
    - connUnitNumSensors (14)
    - connUnitStatusChangeTime (15)
    - connUnitConfigurationChangeTime (16)
    - connUnitNumRevs (17)
    - connUnitNumZones (18)
    - connUnitModuleId (19)
    - connUnitName (20)
    - connUnitInfo (21)
    - connUnitControl (22)
    - connUnitContact (23)
    - connUnitLocation (24)
    - connUnitEventFilter (25)
    - connUnitNumEvents (26)
    - connUnitMaxEvents (27)
    - connUnitEventCurrID (28)

```

**Figure 56** ConnUnitTable hierarchy

```
- connUnitRevsTable (7)
  - connUnitRevsEntry (1)
    - connUnitRevsUnitId (1)
    - connUnitRevsIndex (2)
    - connUnitRevsRevId (3)
    - connUnitRevsDescription (4)
```

**Figure 57** ConnUnitRevs table hierarchy

```

- connUnitSensorTable (8)
  - connUnitSensorEntry (1)
    - connUnitSensorUnitId (1)
    - connUnitSensorIndex (2)
    - connUnitSensorName (3)
    - connUnitSensorStatus (4)
    - connUnitSensorInfo (5)
    - connUnitSensorMessage (6)
    - connUnitSensorType (7)
    - (8)

```

**Figure 58** ConnUnitSensorTable hierarchy

```

- connUnitPortTable (10)
  - connUnitPortEntry (1)
    - connUnitPortUnitId (1)
    - connUnitPortIndex (2)
    - connUnitPortType (3)
    - connUnitPortFCClassCap (4)
    - connUnitPortFCClassOp (5)
    - connUnitPortState (6)
    - connUnitPortStatus (7)
    - connUnitPortTransmitterType (8)
    - connUnitPortModuleType (9)
    - connUnitPortWwn (10)
    - connUnitPortFCId (11)
    - connUnitPortSn (12)
    - connUnitPortRevision (13)
    - connUnitPortVendor (14)
    - connUnitPortSpeed (15)
    - connUnitPortControl (16)
    - connUnitPortName (17)
    - connUnitPortPhysicalNumber (18)
    - connUnitPortStatObject (19)
    - connUnitPortProtocolCap (20)
    - connUnitPortProtocolOp (21)
    - connUnitPortNodeWwn (22)
    - connUnitPortHWState (23)

```

**Figure 59** ConnUnitPortTable hierarchy

```

- connUnitEventTable (11)
  - connUnitEventEntry (2)
    - connUnitEventUnitId (1)
    - connUnitEventIndex (2)
    - connUnitEventId (3)
    - connUnitREventTime (4)
    - connUnitSEventTime (5)
    - connUnitEventSeverity (6)
    - connUnitEventType (7)
    - connUnitEventObject (8)
    - connUnitEventDescr (9)

```

**Figure 60** ConnUnitEventTable hierarchy

```

- connUnitLinkTable (12)
  - connUnitLinkEntry (1)
    - connUnitLinkUnitId (1)
    - connUnitLinkIndex (2)
    - connUnitLinkNodeIdX (3)
    - connUnitLinkPortNumberX (4)
    - connUnitLinkPortWwnX (5)
    - connUnitLinkNodeIdY (6)
    - connUnitLinkPortNumberY (7)
    - connUnitLinkPortWwnY (8)
    - connUnitLinkAgentAddressY (9)
    - connUnitLinkAgentAddressTypeY (10)
    - connUnitLinkAgentPortY (11)
    - connUnitLinkUnitTypeY (12)
    - (13)
    - connUnitLinkCurrIndex (14)

```

**Figure 61** ConnUnitLinkTable hierarchy

```

- trapRegTable (8)
  - trapRegEntry (1)
    - trapRegIpAddress (1)
    - trapRegPort (2)
    - trapRegFilter (3)
    - trapRegRowState (4)

```

**Figure 62** TrapRegTable hierarchy

```

- connUnitPortStatTable (5)
  - connUnitPortStatEntry (1)
    - connUnitPortStatUnitId (1)
    - connUnitPortStatIndex (2)
    - connUnitPortStatCountError (3)
    - connUnitPortStatCountTxObjects (4)
    - connUnitPortStatCountRxObjects (5)
    - connUnitPortStatCountTxElements (6)
    - connUnitPortStatCountRxElements (7)
    - connUnitPortStatCountBBCreditZero (8)
    - connUnitPortStatCountInputBuffersFull (9)
    - connUnitPortStatCountFBSYFrames (10)
    - connUnitPortStatCountPBSYFrames (11)
    - connUnitPortStatCountFRJTFrames (12)
    - connUnitPortStatCountPRJTFrames (13)
    - connUnitPortStatCountClass1RxFrames (14)
    - connUnitPortStatCountClass1TxFrames (15)
    - connUnitPortStatCountClass1FBSYFrames (16)
    - connUnitPortStatCountClass1PBSYFrames (17)
    - connUnitPortStatCountClass1FRJTFrames (18)
    - connUnitPortStatCountClass1PRJTFrames (19)
    - connUnitPortStatCountClass2RxFrames (20)
    - connUnitPortStatCountClass2TxFrames (21)
    - connUnitPortStatCountClass2FBSYFrames (22)
    - connUnitPortStatCountClass2PBSYFrames (23)
    - connUnitPortStatCountClass2FRJTFrames (24)
    - connUnitPortStatCountClass2PRJTFrames (25)
    - connUnitPortStatCountClass3RxFrames (26)
    - connUnitPortStatCountClass3TxFrames (27)
    - connUnitPortStatCountClass3Discards (28)
    - connUnitPortStatCountRxMulticastObjects (29)
    - connUnitPortStatCountTxMulticastObjects (30)
    - connUnitPortStatCountRxBroadcastObjects (31)
    - connUnitPortStatCountTxBroadcastObjects (32)
    - connUnitPortStatCountRxLinkResets (33)
    - connUnitPortStatCountTxLinkResets (34)
    - connUnitPortStatCountNumberLinkResets (35)
    - connUnitPortStatCountRxOfflineSequences (36)
    - connUnitPortStatCountTxOfflineSequences (37)
    - connUnitPortStatCountNumberOfflineSequences (38)
    - connUnitPortStatCountLinkFailures (39)
    - connUnitPortStatCountInvalidCRC (40)
    - connUnitPortStatCountInvalidTxWords (41)
    - connUnitPortStatCountPrimitiveSequenceProtocolErrors (42)
    - connUnitPortStatCountLossOfSignal (43)
    - connUnitPortStatCountLossOfSynchronization (44)
    - connUnitPortStatCountInvalidOrderedSets (45)
    - connUnitPortStatCountFramesTooLong (46)
    - connUnitPortStatCountFramesTruncated (47)
    - connUnitPortStatCountAddressErrors (48)
    - connUnitPortStatCountDelimiterErrors (49)
    - connUnitPortStatCountEncodingDisparityErrors (50)

```

**Figure 63** ConnUnitPortStatTable hierarchy

```

- connUnitServiceSet (5)
  - connUnitServiceScalars (1)
    - connUnitSnsMaxEntry (1)

```

**Figure 64** ConnUnitServiceScalars hierarchy

```

- connUnitServiceSet (5)
  - connUnitServiceTables (2)
    - connUnitSnsTable (1)
      - connUnitSnsEntry (1)
        - connUnitSnsId (1)
        - connUnitSnsPortIndex (2)
        - connUnitSnsPortIdentifier (3)
        - connUnitSnsPortName (4)
        - connUnitSnsNodeName (5)
        - connUnitSnsClassOfSvc (6)
        - connUnitSnsNodeIPAddress (7)
        - connUnitSnsProcAssoc (8)
        - connUnitSnsFC4Type (9)
        - connUnitSnsPortType (10)
        - connUnitSnsPortIPAddress (11)
        - connUnitSnsFabricPortName (12)
        - connUnitSnsHardAddress (13)
        - connUnitSnsSymbolicPortName (14)
        - connUnitSnsSymbolicNodeName (15)

```

**Figure 65** ConnUnitSnsTable hierarchy

## Definitions for FCMGMT-MIB

The definitions in [Table 24](#) are used for FCMGMT-MIB.

**Table 24** Definitions for FCMGMT-MIB

Type definition	Value	Description
FcNameId	Octet string of size 8	The Port Name for this entry in the SNS table.
FcGlobalId	Octet string of size 16	An optional global scope identifier for this connectivity unit. It must be a WWN for this connectivity unit or 16 octets of value zero.
FcAddressId	Octet string of size 3	The Port Identifier for this entry in the SNS table.
FcEventSeverity	Integer	<ul style="list-style-type: none"> <li>1 (unknown)</li> <li>2 (emergency) Emergency status</li> <li>3 (alert) Alert status</li> <li>4 (critical) Critical status</li> <li>5 (error) Error status</li> <li>6 (warning) Warning status</li> <li>7 (notify) Notification status</li> <li>8 (info) Informational status</li> <li>9 (debug) Debug status</li> <li>10 (mark) All messages logged.</li> </ul>

**Table 24** Definitions for FCMGMT-MIB (continued)

Type definition	Value	Description
FcUnitType	Integer	<ul style="list-style-type: none"> <li>1 (unknown)</li> <li>2 (other) None of 3–14.</li> <li>3 (hub) Passive connectivity unit supporting loop protocol</li> <li>4 (switch) Active connectivity unit supporting multiple protocols</li> <li>5 (gateway) Unit that not only converts the interface but also encapsulates the frame into another protocol. The assumption is that there are always two gateways connected together: for example, FC &lt;-&gt; ATM.</li> <li>6 (converter) Unit that converts from one interface to another: for example, FC &lt;-&gt; SCSI.</li> <li>7 (hba) Host bus adapter</li> <li>8 (proxy-agent) Software proxy agent</li> <li>9 (storage-device) Disk, CD, tape, and so forth</li> <li>10 (host) Host computer</li> <li>11 (storage-subsystem) For example, RAID, library</li> <li>12 (module) Subcomponent of a system</li> <li>13 (swdriver) Software driver</li> <li>14 (storage-access-device) Provides storage management and access for heterogeneous hosts and heterogeneous devices.</li> </ul>

## ConnSet group

Implementation of the Connectivity group is mandatory for all systems.

### uNumber

OID 1.3.6.1.3.94.1.1

Description The number of connectivity units present on this system (represented by this agent). Might be a count of the boards in a chassis or the number of full boxes in a rack.

Note The connectivity unit is mapped to a switch. uNumber is always set to 1.

### systemURL

OID 1.3.6.1.3.94.1.2

Description The top-level URL of the system; if it does not exist, the value is an empty string. The URL format is implementation dependent and can have embedded keywords that are preceded by a percent sign (for example, %USER).

The following are the defined keywords that are recognized and replaced with data during a launch:

- USER: Replace with username.
- PASSWORD: Replace with password.
- GLOBALID: Replace with global ID.
- SERIALNO: Replace with serial number.

Note The expected value for system URL.0 is:

`http://{a.b.c.d}`

where {a.b.c.d} is the IP address of the switch if a Web Tools license is available and "" (null) is used when a Web Tools license is not available.



## Connectivity unit table

### connUnitTable

OID	1.3.6.1.3.94.1.6
Description	A list of units under a single SNMP agent. The number of entries is given by the value of uNumber. The value is 1 for stand-alone system.

### connUnitEntry

OID	1.3.6.1.3.94.1.6.1
Description	A connectivity unit entry containing objects for a particular unit.
Index	connUnitId

### connUnitId

OID	1.3.6.1.3.94.1.6.1.1
Description	The unique identification for this connectivity unit among those within this proxy domain. The value must be unique within the proxy domain because it is the index variable for connUnitTable. The value assigned to a given connectivity unit should be persistent across agent and unit resets. It should be the same as connUnitGlobalId if connUnitGlobalId is known and stable.
Note	<p>The HP implementation maps the switch WWN to the top 8 octets of this variable and sets the remaining lower 8 octets to 0.</p> <p>To specify a particular instance of any columnar variable in the connUnitEntry (such as connUnitType), specify the instance identifier as a 16-octet value.</p> <p>Example:</p> <pre>connUnitType.10.0.0.60.69.4.11.19.0.0.0.0.0.0.0.0</pre> <p>where the object instance identifier consists of 16 octets, each representing the byte value from high-byte order to low-byte order of this 128-bit integer.</p>

OID	1.3.6.1.3.94.1.6.1.2
Description	<p>An optional global-scope identifier for this connectivity unit. It must be a WWN for this connectivity unit or 16 octets of value 0.</p> <p>The following characteristics are required:</p> <ul style="list-style-type: none"> <li>• WWN formats requiring fewer than 16 octets must be extended to 16 octets with trailing 0 octets.</li> <li>• If a WWN is used for connUnitId, the same WWN must be used for connUnitGlobalId.</li> </ul> <p>When a non-zero value is provided, the following characteristics are strongly recommended:</p> <ul style="list-style-type: none"> <li>• It should be persistent across agent and unit resets.</li> <li>• It should be globally unique.</li> <li>• It should be one of these FC-PH/PH3 formats: <ul style="list-style-type: none"> <li>• IEEE (NAA=1)</li> <li>• IEEE Extended (NAA=2)</li> <li>• IEEE Registered (NAA=5)</li> <li>• IEEE Registered extended (NAA=6)</li> </ul> </li> </ul> <p>Using the IEEE formats allows any IEEE-registered vendor to assure global uniqueness independently. The following are some references on IEEE WWN formats:</p> <p><a href="http://standards.ieee.org/regauth/oui/tutorials/fibreformat.html">http://standards.ieee.org/regauth/oui/tutorials/fibreformat.html</a>  <a href="http://standards.ieee.org/regauth/oui/tutorials/fibrecomp_id.html">http://standards.ieee.org/regauth/oui/tutorials/fibrecomp_id.html</a></p> <p>If one or more WWNs are associated with the connUnit via other management methods, one of them should be used for connUnitGlobalId.</p> <p>If a WWN is not assigned specifically to the connUnit, there is some merit to using a WWN assigned to (one of) its permanently attached FC/LAN interfaces. This must not risk uniqueness, though.</p> <p>As a counterexample, if your agent runs in a host and the host has an HBA, it is quite possible that agent, host, and HBA are all distinct connUnits, so the host and agent cannot use the WWN of the HBA.</p> <p>If your hub has a built-in Ethernet port, it might be reasonable for the hub to use its LAN address (prefixed with the appropriate NAA) as its connUnitId. But if the Ethernet is a replaceable PCCard, the hub should have an independent ID.</p>
Note	<p>The HP implementation maps the switch WWN to the top 8 octets of this variable and sets the remaining lower 8 octets to 0.</p> <p>Example:</p> <p>If the HP switch WWN is 10:0:0:60:69:10:02:18, then use the SNMP GET command on connUnitGlobalId.10.0.0.60.69.10.02.18.0.0.0.0.0.0.0.0 returns:</p> <pre>10 00 00 60 69 10 02 18 00 00 00 00 00 00 00 00</pre>

## connUnitType

OID	1.3.6.1.3.94.1.6.1.3
Description	The type of this connectivity unit.
Note	Set to 4 (switch).

## connUnitNumports

OID	1.3.6.1.3.94.1.6.1.4
Description	Number of physical ports (between 0 and the <i>maximum number of system supported ports</i> ) in the connectivity unit (internal/embedded, external).
Note	<p>To determine the <i>maximum number of system supported ports</i>, use the <code>SNMP GET</code> command on <code>swFcPortCapacity</code>.</p> <p>HP StorageWorks switches support 0 to <i>maximum number of system supported ports</i>.</p> <p>The maximum number of supported ports are as follows:</p> <ul style="list-style-type: none"><li>• 8 for the SAN Switch 2/8-EL and SAN Switch 2/8V</li><li>• 12 for the Brocade 4Gb SAN Switch for HP p-Class BladeSystem</li><li>• 16 for the 4/8 SAN Switch, 4/16 SAN Switch, SAN Switch 2/16, and SAN Switch 2/16V</li><li>• 32 for the SAN Switch 2/32 and SAN Switch 4/32</li><li>• 64 for the Core Switch 2/64</li><li>• 128 for the SAN Director 2/128</li><li>• 256 for the 4/256 SAN Director</li></ul>

## connUnitState

OID	1.3.6.1.3.94.1.6.1.5
Description	<p>Overall state of the connectivity unit:</p> <ul style="list-style-type: none"><li>• Unknown (1)</li><li>• Online (2): Set the state to online.</li><li>• Offline (3): Set the state to offline.</li></ul> <p>Mapped as follows:</p> <pre>switchState(ONLINE)2 (online) switchState(not ONLINE)3 (offline, testing, faulty)</pre>

## connUnitStatus

OID	1.3.6.1.3.94.1.6.1.6
Description	Overall status of the connectivity unit: <ul style="list-style-type: none"><li>• Unknown (1)</li><li>• Unused (2)</li><li>• OK (3)</li><li>• Warning (4): Needs attention.</li><li>• Failed (5)</li></ul>
Note	switchStatus maps directly as follows: <ul style="list-style-type: none"><li>• connUnitStatusswitchStatus</li><li>• 1 (unknown): Unknown</li><li>• 2 (unused): Unmonitored</li><li>• 3 (ok): Healthy/ok</li><li>• 4 (warning): Marginal/Warning</li><li>• 5 (failed): Down/Failed</li></ul>

## connUnitProduct

OID	1.3.6.1.3.94.1.6.1.7
Description	The connectivity unit vendor's product model name.
Note	This is the same as for sysDescr (set for as many as 79 bytes).

## connUnitSn

OID	1.3.6.1.3.94.1.6.1.8
Description	The serial number for this connectivity unit.
Note	Set to the SSN (which by default is the WWN).

## connUnitUpTime

OID	1.3.6.1.3.94.1.6.1.9
Description	The number of centiseconds since the last unit initialization.
Note	Set when connUnitTable is initialized.

## connUnitUrl

OID	1.3.6.1.3.94.1.6.1.10
Description	URL to launch a management application, if applicable; otherwise an empty string. In a standalone unit, this would be the same as the top-level URL. This has the same definition as systemURL for keywords.
Note	Same as systemURL. The expected value for connUnitURL.0 is: <pre>"http://{a.b.c.d}"</pre> where {a.b.c.d} is the IP address of the switch if Web Tools license is available and "" (null) is the IP address of the switch if Web Tools license is not available.

### connUnitDomainId

OID	1.3.6.1.3.94.1.6.1.11
Description	24-bit Fibre Channel address ID of this connectivity unit, right-justified with leading 0s if required. If this value is not applicable, return all bits to 1.
Note	Set to the switch domain ID (as per FC-SW).

### connUnitProxyMaster

OID	1.3.6.1.3.94.1.6.1.12
Description	<p>A value of <code>yes</code> means this is the proxy master unit for a set of managed units. Possible values are:</p> <ul style="list-style-type: none"><li>• unknown (1)</li><li>• no (2)</li><li>• yes (3)</li></ul> <p>For Example, this could be the only unit with a management card in it for a set of units. A standalone unit should return <code>yes</code> for this object.</p>
Note	Set to 3 (yes).

### connUnitPrincipal

OID	1.3.6.1.3.94.1.6.1.13
Description	<p>Indicates whether this connectivity unit is the principal unit within the group of FEs. If this value is not applicable, it returns <code>unknown</code>. Possible values are:</p> <ul style="list-style-type: none"><li>• unknown (1)</li><li>• no (2)</li><li>• yes (3)</li></ul>
Note	If the switch is principal, this is set to 3 (yes); otherwise, it is set to 2 (no).

### connUnitNumSensors

OID	1.3.6.1.3.94.1.6.1.14
Description	Number of sensors (between 0 and <i>maximum number of sensors</i> ) in the <code>connUnitSensorTable</code> .
Note	See <a href="#">Table 13</a> on page 152 for specific sensor counts on the various switches.

### connUnitStatusChangeTime

OID	1.3.6.1.3.94.1.6.1.15
Description	The sysuptime time stamp (in centiseconds) at which the last status change occurred for any members of the set; this is the latest time stamp that <code>connUnitStatus</code> or <code>connUnitPortStatus</code> changed.
Note	Not supported.

## connUnitConfigurationChangeTime

OID	1.3.6.1.3.94.1.6.1.16
Description	The sysuptime time stamp (in centiseconds) at which the last configuration change occurred for any members of the set. In other words, this is the latest time stamp of flash memory update. This represents a union of change information for connUnitConfigurationChangeTime
Note	Not supported.

## connUnitNumRevs

OID	1.3.6.1.3.94.1.6.1.17
Description	The number of revisions in connUnitRevsTable.
Note	Set to 2.

## connUnitNumZones

OID	1.3.6.1.3.94.1.6.1.18
Description	Number of zones defined in connUnitZoneTable.
Note	Not supported.

## connUnitModuleId

OID	1.3.6.1.3.94.1.6.1.19
Description	A unique ID, persistent between boots, that can be used to group a set of connUnits together into a module. The intended use would be to create a connUnit with a connUnitType of <code>module</code> to represent a physical or logical group of connectivity units. Then the value of the group would be set to the value of connUnitId for this container connUnit.  connUnitModuleId should be 0s if this connUnit is not part of a module.
Note	Set to the WWN of the switch.

## connUnitName

OID	1.3.6.1.3.94.1.6.1.20
Description	A display string containing a name for this connectivity unit. This object value should be persistent between boots.
Note	Set to switchName/sysName.

## connUnitInfo

OID	1.3.6.1.3.94.1.6.1.21
Description	A display string containing information about this connectivity unit. This object value should be persistent between boots.
Note	Set to sysDescr and read-only.

## connUnitControl

OID	1.3.6.1.3.94.1.6.1.22
Description	<p>Controls the addressed connUnit. Each implementation might choose not to allow any or all of these values on a SET. Possible values are:</p> <ul style="list-style-type: none"><li>• unknown (1)</li><li>• invalid (2)</li><li>• resetConnUnitColdStart (3): Reboot. Performs a switch reboot.</li><li>• resetConnUnitWarmStart (4): Fastboot. The addressed unit performs a Warm Start reset.</li><li>• offlineConnUnit (5): Disable switch. The addressed unit puts itself into an implementation-dependant offline state. In general, if a unit is in an offline state, it cannot be used to perform meaningful Fibre Channel work.</li><li>• onlineConnUnit (6): Enable switch. The addressed unit puts itself into an implementation-dependant online state. In general, if a unit is in an online state, it is capable of performing meaningful Fibre Channel work.</li></ul> <p>Cold start and warm start are as defined in MIB-II and are not meant to be a factory reset. This is similar to swAdmStatus:</p> <ul style="list-style-type: none"><li>• resetConnunitColdStart = reboot</li><li>• resetConnunitWarmStart = fastboot</li><li>• offlineConnUnit = disable switch</li><li>• onlineConnUnit = enable switch</li><li>• default after reboot = unknown</li></ul> <p>The declaration 1 (unknown) maps to the default value upon rebooting; 2 (invalid) is not applicable.</p>
Note	Declarations 3 and 4 both perform the same operation—a cold boot of the switch.

## connUnitContact

OID	1.3.6.1.3.94.1.6.1.23
Description	Contact information for this connectivity unit.
Note	Displays the same value as sysContact. Changing the value in this variable also causes the value in sysContact to be changed.

## connUnitLocation

OID	1.3.6.1.3.94.1.6.1.24
Description	Location information for this connectivity unit.
Note	Displays the same value as sysLocation.

## connUnitEventFilter

OID	1.3.6.1.3.94.1.6.1.25
Description	Defines the event severity logged by this connectivity unit. All events of severity less than or equal to connUnitEventFilter are logged in connUnitEventTable.
Note	Always returns the value 9 (debug).

## connUnitNumEvents

OID	1.3.6.1.3.94.1.6.1.26
Description	Number of events currently in connUnitEventTable.
Note	For Fabric OS 3.0 this value ranges from 0 to 64. For Fabric OS 4.0 this value ranges from 0 to 255. For Fabric OS 4.2 this value ranges from 0 to 2048. For Fabric OS 4.4 this value ranges from 0 to 1024. For Fabric OS 5.x this value ranges from 0 to 1024.

## connUnitMaxEvents

OID	1.3.6.1.3.94.1.6.1.27
Description	Maximum number of events that can be defined in connUnitEventTable.
Note	For Fabric OS 3.0 this value is 64. For Fabric OS 4.0 this value is 255. For Fabric OS 4.2 this value is 2048. For Fabric OS 4.4 this value is 1024. For Fabric OS 5.x this value is 1024.

## connUnitEventCurrID

OID	1.3.6.1.3.94.1.6.1.28
Description	The last-used event ID (connUnitEventId).
Note	Maximum is 2147483647 ( $2^{31}-1$ ).

## Connectivity unit revisions table

### connUnitRevsTable

OID	1.3.6.1.3.94.1.7
Description	Table of the revisions supported by connectivity units managed by this agent.
Usage Notes	This table lists the versions of hardware and software elements in the switch.  There is one entry for the hardware platform version (for the SAN Switch 4/32, this value is 23.1) and another entry for the Fabric OS version (for this release the value is 4.4).

### connUnitRevsEntry

OID	1.3.6.1.3.94.1.7.1
Description	Table of the revisions supported by connectivity units managed by this agent.
Index	connUnitRevsUnitId connUnitRevsIndex

### connUnitRevsUnitId

OID	1.3.6.1.3.94.1.7.1.1
Description	The connUnitId value for the connectivity unit that contains this revision table.



### connUnitRevsIndex

OID	1.3.6.1.3.94.1.7.1.2
Description	A unique value among all connUnitRevsEntrys with the same value of connUnitRevsUnitId, in the range between 1 and connUnitNumRevs.
Note	Index 1 returns the hardware version. Index 2 returns the software version.

### connUnitRevsRevId

OID	1.3.6.1.3.94.1.7.1.3
Description	A vendor-specific string identifying a revision of a component of the connUnit indexed by connUnitRevsUnitId.
Note	Index 1 returns the switchType from switchShow. Index 2 returns the Fabric OS version from telnet command version: for example, 2.6.

### connUnitRevsDescription

OID	1.3.6.1.3.94.1.7.1.4
Description	Description of a component to which the revision corresponds.
Note	Index 1 returns the hardware version. Index 2 returns the software version.

## Connectivity unit sensor table

### connUnitSensorTable

OID	1.3.6.1.3.94.1.8
Description	Table of the sensors supported by each connectivity unit managed by this agent.
Note	See <a href="#">Table 13</a> on page 152 for specific sensor counts on the various switches.

### connUnitSensorEntry

OID	1.3.6.1.3.94.1.8.1
Description	Each entry contains the information for a specific sensor.
Index	connUnitSensorUnitId connUnitSensorIndex

### connUnitSensorUnitId

OID	1.3.6.1.3.94.1.8.1.1
Description	The connUnitId value of the connectivity unit that contains this sensor table.
Note	Set to connUnitId.

### connUnitSensorIndex

OID	1.3.6.1.3.94.1.8.1.2
Description	A unique value among all connUnitSensorEntrys with the same value of connUnitSensorUnitId, in the range between 1 and the return value from connUnitNumSensor.

### connUnitSensorName

OID	1.3.6.1.3.94.1.8.1.3
Description	A textual identification of the sensor, intended primarily for operator use.
Note	Each identification contains the name of sensor in textual format: for example, Temp #1, Fan #2, and so forth.

### connUnitSensorStatus

OID	1.3.6.1.3.94.1.8.1.4
Description	The status indicated by the sensor: <ul style="list-style-type: none"><li>• unknown (1)</li><li>• other (2)</li><li>• ok (3)</li><li>• warning (4)</li><li>• failed (5)</li></ul>
Note	Nominal = 3 (ok). Not nominal = 5 (failed).

### connUnitSensorInfo

OID	1.3.6.1.3.94.1.8.1.5
Description	Miscellaneous static information about the sensor, such as its serial number.
Note	Each contains textual information about the sensor. Returns the serial ID if this is for the power supply; otherwise, returns Null.

### connUnitSensorMessage

OID	1.3.6.1.3.94.1.8.1.6
Description	Describes the status of the sensor as a message. It might also provide more resolution on the sensor indication; for example, cover temperature 1503K, above nominal operating range.
Note	Each contains the sensor status (and reading, if applicable) in textual format.

### connUnitSensorType

OID	1.3.6.1.3.94.1.8.1.7
Description	The type of component being monitored by this sensor: <ul style="list-style-type: none"><li>• unknown (1)</li><li>• other (2)</li><li>• battery (3)</li><li>• fan (4)</li><li>• power-supply (5)</li><li>• transmitter (6)</li><li>• enclosure (7)</li><li>• board (8)</li><li>• receiver (9)</li></ul>

Note The following mapping is for each individual sensor, where applicable:

<b>swSensorType</b>	<b>connUnitSensorType</b>
1 (temperature)	8 (board)
2 (fan)	4 (fan)
3 (power supply)	5 (power supply)

### connUnitSensorCharacteristic

OID 1.3.6.1.3.94.1.8.1.8

Description The characteristics being monitored by this sensor. Possible values are:

- unknown (1)
- other (2)
- temperature (3)
- pressure (4)
- emf (5)
- currentValue (6): (Note that current is a keyword.)
- airflow (7)
- frequency (8)
- power (9)
- door (10) Not supported in Fabric OS 2.6.1.

Note The following mapping is for each individual sensor, where applicable:

<b>swSensorType</b>	<b>connUnitSensorCharacteristic</b>
1 (temperature)	3 (temperature)
2 (fan)	7 (airflow)
3 (power supply)	9 (power)

## Connectivity unit port table

### connUnitPortTable

OID 1.3.6.1.3.94.1.10

Description Generic information on ports for a specific connUnit.

### connUnitPortEntry

OID 1.3.6.1.3.94.1.10.1

Description Each entry contains the information for a specific port.

Index  
connUnitPortUnitId  
connUnitPortIndex

## connUnitPortUnitId

OID	1.3.6.1.3.94.1.10.1.1
Description	The connUnitId value of the connectivity unit that contains this port.
Note	Same value as connUnitId.

## connUnitPortIndex

OID	1.3.6.1.3.94.1.10.1.2
Description	Number of physical ports between 0 and <i>maximum number of system supported ports</i> in the connectivity unit (internal/embedded, external).
Note	<p>To determine the <i>maximum number of system supported ports</i>, use the <code>SNMP GET</code> command on <code>swFcPortCapacity</code>.</p> <p>The HP StorageWorks switches support 0 to <i>maximum number of system supported ports</i>.</p> <p>The maximum number of supported ports are as follows:</p> <ul style="list-style-type: none"><li>• 8 for the SAN Switch 2/8-EL and SAN Switch 2/8V</li><li>• 12 for the Brocade 4Gb SAN Switch for HP p-Class BladeSystem</li><li>• 16 for the 4/8 SAN Switch, 4/16 SAN Switch, SAN Switch 2/16, and SAN Switch 2/16V</li><li>• 32 for the SAN Switch 2/32 and SAN Switch 4/32</li><li>• 64 for the Core Switch 2/64</li><li>• 128 for the SAN Director 2/128</li><li>• 256 for the 4/256 SAN Director</li></ul>

## connUnitPortType

OID	1.3.6.1.3.94.1.10.1.3
Description	<p>The port types are:</p> <ul style="list-style-type: none"><li>• unknown (1)</li><li>• other (2)</li><li>• not-present (3)</li><li>• hub-port (4)</li><li>• n-port (5): End port for fabric</li><li>• l-port (6): End port for loop</li><li>• fl-port (7): Public loop</li><li>• f-port (8): Fabric port</li><li>• e-port (9): Fabric expansion port</li><li>• g-port (10): Generic fabric port</li><li>• domain-ctl (11): Domain controller</li><li>• hub-controller (12)</li><li>• scsi (13): Parallel SCSI port</li><li>• escon (14)</li><li>• lan (15)</li><li>• wan (16)</li><li>• ac (17): AC power line. (Not supported in Fabric OS 2.6.1.)</li><li>• dc (18): DC power line. (Not supported in Fabric OS 2.6.1.)</li><li>• ssa (19): Serial storage architecture. (Not supported in Fabric OS 2.6.1.)</li></ul>

Note	<p>Mapped as:</p> <ul style="list-style-type: none"> <li>• U_Port = 10 (g-port)</li> <li>• F_Port = 8 (f-port)</li> <li>• FL_Port = 7 (fl-port)</li> <li>• E_Port = 9 (e-port)</li> </ul>
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### connUnitPortFCClassCap

OID	1.3.6.1.3.94.1.10.1.4
Description	<p>Bit mask that specifies the Classes of Service capability of this port. If this is not applicable, return all bits set to 0.</p> <p>The bits have the following definition:</p> <ul style="list-style-type: none"> <li>• unknown0</li> <li>• class-f1</li> <li>• class-one2</li> <li>• class-two4</li> <li>• class-three8</li> <li>• class-four16</li> <li>• class-five32</li> <li>• class-six64</li> </ul>
Note	For an F_Port or FL_Port, this value is 0x000C. For a G_Port or E_Port, this value is 0x000D.

### connUnitPortFCClassOp

OID	1.3.6.1.3.94.1.10.1.5
Description	Bit mask that specifies the Classes of Service that are currently operational. If this is not applicable, returns all bits set to 0. This object has the same definition as connUnitPortFCClassCap.
Note	For an F_Port or FL_Port, this value is 0x000C. For a G_Port or E_Port, this value is 0x000D.

### connUnitPortState

OID	1.3.6.1.3.94.1.10.1.6
Description	<p>The state of the port hardware:</p> <ul style="list-style-type: none"> <li>• unavailable (1): Do not use.</li> <li>• online (2): Available for meaningful work.</li> <li>• offline (3): Not available for meaningful work.</li> <li>• bypassed (4): No longer used.</li> <li>• diagnostics (5): Map to your testing. (Not supported in Fabric OS 2.6.1.)</li> </ul>
Note	For an E, F, or FL_Port, the value is online. For a U_Port, the value is offline (disabled, testing, faulted).

## connUnitPortStatus

OID	1.3.6.1.3.94.1.10.1.7
Description	<p>An overall protocol status for the port:</p> <ul style="list-style-type: none"><li>• unknown (1)</li><li>• unused (2): Device cannot report this status.</li><li>• ready (3): FCAL Loop or FCPH Link reset protocol initialization has completed.</li><li>• warning (4): Do not use.</li><li>• failure (5): Do not use.</li><li>• notparticipating (6): Loop is not participating and does not have a loop address.</li><li>• initializing (7): Protocol is proceeding.</li><li>• bypass (8): Do not use.</li><li>• ols (9): FCP offline status. (Not supported in Fabric OS 2.6.1.)</li></ul>
Note	For an E, F, or FL_Port, the value is 3 (ok). For a U_Port, the value is 2 (unused) if not faulty with GBIC, 3 (warning) if not faulty but no GBIC, or 5 (failure) if faulty.

## connUnitPortTransmitterType

OID	1.3.6.1.3.94.1.10.1.8
Description	<p>The technology of the port transceiver:</p> <ul style="list-style-type: none"><li>• unknown (1)</li><li>• other (2)</li><li>• unused (3)</li><li>• shortwave (4)</li><li>• longwave (5)</li><li>• copper (6)</li><li>• scsi (7)</li><li>• longwaveNoOFC (8)</li><li>• shortwaveNoOFC (9)</li><li>• longwaveLED (10)</li><li>• ssa (11) (Not supported in Fabric OS 2.6.1.)</li></ul>
Note	For an external FC_Port, this value should be 9 (shortwaveNoOFC), 8 (longwaveNoOFC), or 6 (copper).

## connUnitPortModuleType

OID	1.3.6.1.3.94.1.10.1.9
Description	<p>The module type of the port connector:</p> <ul style="list-style-type: none"><li>• unknown (1)</li><li>• other (2)</li><li>• gbic (3)</li><li>• embedded (4): Fixed (oneXnine)</li><li>• glm (5)</li><li>• gbicSerialId (6)</li><li>• gbicNoSerialId (7)</li><li>• gbicNotInstalled (8)</li><li>• smallFormFactor (9)</li></ul>

Note	For an external FC_Port with GBIC, this value is set to 6 (gbicSerialId) or 7 (gbicNoSerialId). For an external FC_Port without GBIC, this value is set to 8 (gbicNotInstalled).
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### connUnitPortWwn

OID	1.3.6.1.3.94.1.10.1.10
Description	The WWN of the port, if applicable; otherwise, an empty string.  This is in IEEE Extended format, and the extension contains the internal port number of each port.
Note	The internal port number is 1 less than the port index. For example, if the switch has WWN 10:00:00:60:69:10:02:18, then port numbers 0 and 6 have WWN 20:00:00:60:69:10:02:18 and 20:06:00:60:69:10:02:18, respectively. However, the embedded port has WWN 10:00:00:60:69:10:02:18, the same as the switch.

### connUnitPortFCId

OID	1.3.6.1.3.94.1.10.1.11
Description	The assigned Fibre Channel ID of this port. This value is expected to be a Big Endian value of 24 bits. If this is a loop, then it is the AL_PA that is connected. If this is an E_Port, then it contains only the domain ID, left justified, 0 filled. If this port does not have a Fibre Channel address, return all bits set to 1.
Note	For an F_Port, this is the Fibre Channel ID to which the connected N_port is assigned. For an FL_Port, this is the Fibre Channel ID of the FL_Port (alpa = 0). For a U_Port or E_Port, this is similar to F_Port.

### connUnitPortSn

OID	1.3.6.1.3.94.1.10.1.12
Description	The serial number of the unit (for example, for a GBIC). If this is not applicable, returns an empty string.
Note	If the GBIC has a serial ID, the return value is the GBIC part number; otherwise, the return value is Null.

### connUnitPortRevision

OID	1.3.6.1.3.94.1.10.1.13
Description	The port revision (for example, GBIC).
Note	If the GBIC has a serial ID, this returns the GBIC revision number; otherwise, it returns a Null value.

### connUnitPortVendor

OID	1.3.6.1.3.94.1.10.1.14
Description	The port vendor (for example, for a GBIC).
Note	If the GBIC has a serial ID, this returns the GBIC vendor name; otherwise, it returns a Null value.

## connUnitPortSpeed

OID	1.3.6.1.3.94.1.10.1.15
Description	The speed of the port, in kilobytes per second (KBps).
Note	For example, the valid values for the Core Switch 2/64, SAN Director 2/128, and 4/256 SAN Director: 125,000 KBps, 250,000 KBps, or 500,000 KBps, depending on the configuration.

## connUnitPortControl

OID	1.3.6.1.3.94.1.10.1.16
Description	<p>Controls the addressed connUnit's port.</p> <p>Valid commands are:</p> <ul style="list-style-type: none"><li>• <b>resetConnUnitPort</b> If the addressed connUnit allows this operation to be performed to this port, the addressed port performs a vendor-specific reset operation. Examples of these operations are:<ul style="list-style-type: none"><li>• The Link Reset protocol.</li><li>• The Loop Initialization protocol.</li><li>• Resynchronization occurring between the transceiver in the addressed port to the transceiver to which the port is connected.</li></ul></li><li>• <b>bypassConnUnitPort</b> If the addressed connUnit allows this operation to be performed to this port, the addressed port performs a vendor-specific bypass operation. Examples of these operations are:<ul style="list-style-type: none"><li>• Transitioning from online to offline.</li><li>• A request (NON-PARTICIPATING) command to the loop port state machine.</li><li>• Removal of the port from an arbitrated loop by a hub.</li></ul></li><li>• <b>unbypassConnUnitPort</b> If the addressed connUnit allows this operation to be performed to this port, the addressed port performs a vendor-specific unbypass operation. Examples of these operations are:<ul style="list-style-type: none"><li>• The Link Failure protocol.</li><li>• A request (PARTICIPATING) command to the loop port state machine.</li><li>• The addition of the port to an arbitrated loop by a hub.</li></ul></li><li>• <b>offlineConnUnitPort</b> If the addressed connUnit allows this operation to be performed to this port, the addressed port performs a vendor-specific offline operation. Examples of these operations are:<ul style="list-style-type: none"><li>• Disabling a port's transceiver.</li><li>• The Link Failure protocol.</li><li>• Request (NON-PARTICIPATING) command to the loop port state machine removal of the port from an arbitrated loop by a hub.</li></ul></li><li>• <b>onlineConnUnitPort</b> If the addressed connUnit allows this operation to be performed to this port, the addressed port performs a vendor-specific online operation. Examples of these operations are:<ul style="list-style-type: none"><li>• Enabling a port's transceiver.</li><li>• The Link Failure protocol, request (PARTICIPATING) command to the loop port state machine.</li></ul></li></ul>



- Addition of the port from an arbitrated loop by a hub.

Each implementation might choose not to allow any or all of these values on a SET.

If the management station uses in-band communication (FC-IP) with the switch, either of the two following actions might result in a loss of in-band communication with the switch:

- Disabling the FC port that is connected to the management station.
- Disabling the embedded port.

Note

Return values are:

- resetConnUnitPortportDisable (F or E\_Port, loop for U\_Port)
- bypassConnUnitPort portDisable (FL\_Port)
- unbypassConnUnitPort portEnable (FL\_Port)
- offlineConnUnitPort portDisable (E, F, FL\_Port)
- onlineConnUnitPort portEnable (U)
- resetConnUnitPortCounters clear the port statistics counter. When rebooted, this defaults to 1 (unknown).

### connUnitPortName

OID 1.3.6.1.3.94.1.10.1.17

Description A string describing the addressed port.

Note This object is read-only for HP StorageWorks switches.

### connUnitPortPhysicalNumber

OID 1.3.6.1.3.94.1.10.1.18

Description The internal port number by which this port is known. In many implementations, this should be the same as connUnitPortIndex. Some implementations might have an internal port representation that is not compatible with the rules for table indices. In these cases, provide the internal representation of this port in this object.

This value might also be used in the connUnitLinkPortNumberX or connUnitLinkPortNumberY objects of the connUnitLinkTable.

Note The internal port numbers for HP switches. The HP StorageWorks switches support 0 through *maximum number of ports*.

The maximum number of supported ports are as follows:

- 8 for SAN Switch 2/8-EL and SAN Switch 2/8V
- 12 for the Brocade 4Gb SAN Switch for HP p-Class BladeSystem
- 16 for the 4/8 SAN Switch, 4/16 SAN Switch, SAN Switch 2/16, and SAN Switch 2/16V
- 32 for SAN Switch 2/32 and SAN Switch 4/32
- 64 for the Core Switch 2/64
- 128 for SAN Director 2/128
- 256 for 4/256 SAN Director

## connUnitPortStatObject

OID	1.3.6.1.3.94.1.10.1.19
Description	This contains the OID of the first object of the table that contains the statistics for this particular port. If this has a value of 0, then there are no statistics available for this port. The port type information helps identify the statistics objects found in the table. From this point, use the <code>getNext</code> command to get the next statistics object. When the first part of the OID changes, the end of table has been reached.
Note	Mapped to <code>connUnitPortStatFabricUnitId</code> .

## connUnitPortProtocolCap

Not supported in Fabric OS 2.6.1.

OID	1.3.6.1.3.94.1.10.1.20
Description	The bit mask that specifies the driver-level protocol capability of this port. If this is not applicable, return all bits set to 0. Return value = 07F
Note	The bits have the following definitions: <ul style="list-style-type: none"><li>• 0 = unknown</li><li>• 1 = Loop</li><li>• 2 = Fabric</li><li>• 4 = SCSI</li><li>• 8 = TCP/IP</li><li>• 16 = VI</li><li>• 32 = FICON</li></ul>

## connUnitPortProtocolOp

Not supported in Fabric OS 2.6.1.

OID	1.3.6.1.3.94.1.10.1.21
Description	The bit mask that specifies the driver level protocols that are currently operational. Return value = 07F
Note	If this is not applicable, return all bits set to zero. The bits have the following definitions: <ul style="list-style-type: none"><li>• 0 = unknown</li><li>• 1 = Loop</li><li>• 2 = Fabric</li><li>• 4 = SCSI</li><li>• 8 = TCP/IP</li><li>• 16 = VI</li><li>• 32 = FICON</li></ul>

## connUnitPortNodeWwn

Not supported in Fabric OS 2.6.1.

OID 1.3.6.1.3.94.1.10.1.22

Description The node WWN of the port, if applicable; otherwise, an empty string.

All related ports within a group should have the same node WWN value. The container is defined as the largest physical entity. For example:

- All ports on HBAs on a host will have the same node WWN. All ports on the same storage subsystem will have the same node WWN.
- This is in IEEE Extended format; the extension contains the internal port number of each port.

Note The internal port number is 1 less than the port index. For example, if the switch has WWN 10:00:00:60:69:10:02:18, then port number 0 and 6 have WWN 20:00:00:60:69:10:02:18 and 20:06:00:60:69:10:02:18, respectively. However, the embedded port has WWN 10:00:00:60:69:10:02:18, the same as the switch.

## connUnitPortHWState

Not supported in Fabric OS 2.6.1.

OID 1.3.6.1.3.94.1.10.1.23

Description The state of the port as detected by the hardware. Possible values are:

- unknown (1)
- failed (2): Port failed diagnostics (port\_flt\_state).
- bypassed (3): FCAL bypass, loop only (not used).
- active (4): Connected to a device (light and sync are present).
- loopback (5): Port in ext loopback (loopback state).
- txfault (6): Transmitter fault (bad GBIC).
- noMedia (7): Media not installed (GBIC removed).
- linkDown (8): Waiting for activity—rx sync (light with no sync).

## Connectivity unit event table

### connUnitEventTable

OID 1.3.6.1.3.94.1.11

Description The table of connectivity unit events. Errors, warnings, and information should be reported in this table.

Note (3.0 only) This table contains the 64 most-recent event log entries.  
(4.0 only) This table contains the 255 most-recent event log entries.  
(4.2 only) This table contains the 2048 most-recent event log entries.  
(4.4 only) This table contains the 1024 most-recent event log entries.

Only external RASlog messages are supported. Fabric OS 4.4.0 does not have Panic or Debug level messages. All messages are documented in the *HP StorageWorks Fabric OS 5.x diagnostics and system error messages reference guide*.

## connUnitEventEntry

OID	1.3.6.1.3.94.1.11.1
Description	Each entry contains information on a specific event for the given connectivity unit.
Index	connUnitEventUnitId connUnitEventIndex

## connUnitEventUnitId

OID	1.3.6.1.3.94.1.11.1.1
Description	The connUnitId of the connectivity unit that contains this event table.
Note	Same as connUnitId.

## connUnitEventIndex

OID	1.3.6.1.3.94.1.11.1.2
Description	<p>Each connectivity unit has its own event buffer. As it wraps, it might write over previous events. This object is an index into the buffer. HP recommends that this table be read using getNext commands to retrieve the initial table.</p> <p>The management application should read the event table at periodic intervals and then determine whether any new entries were added by comparing the last known index value with the current highest index value. The management application should then update its copy of the event table. If the read interval is too long, it is possible that there might be events that might not be contained in the agent's internal event buffer.</p> <p>For Example:</p> <p>An agent might read events 50-75.</p> <p>At the next read interval, connUnitEventCurrID is 189. If the management application tries to read event index 76 and the agent's internal buffer is 100 entries maximum, event index 76 is no longer available.</p> <p>The index value is an incrementing integer starting from 1 every time there is a table reset. On table reset, all contents are emptied and all indices are set to 0. When an event is added to the table, the event is assigned the next-higher integer value than the last item entered into the table. If the index value reaches its maximum value, the next item entered causes the index value to roll over and start at 1 again.</p>
Note	Mapped to swEventIndex.

## connUnitEventId

OID	1.3.6.1.3.94.1.11.1.3
Description	The internal event ID. Incremented for each event, ranging between 0 and connUnitMaxEvents. Not used as table index to simplify the agent implementation. When the ID reaches the end of the range specified by connUnitMaxEvents, it rolls over to start at 0. This value is set back to 0 at reset. The relationship of this value to the index is that internal event ID might represent a smaller number than a 32-bit integer (for example, maximum 100 entries) and would have a value range only up to connUnitMaxEvents.
Note	Same function as connUnitEventIndex.

## connUnitREventTime

OID	1.3.6.1.3.94.1.11.1.4
Description	The real time when the event occurred. It has the following format.  <i>DDMMYYYY HHMMSS</i>  where:  <i>DD</i> = day number <i>MM</i> = month number <i>YYYY</i> = year <i>HH</i> = hours <i>MM</i> = minutes <i>SS</i> = seconds  If not applicable, returns a null string.

## connUnitSEventTime

OID	1.3.6.1.3.94.1.11.1.5
Description	The systime time stamp when the event occurred.

## connUnitEventSeverity

OID	1.3.6.1.3.94.1.11.1.6														
Description	The event severity level. The mapping between errorlog severity level and this variable is:  <table><thead><tr><th>Error log</th><th>FA-MIB</th></tr></thead><tbody><tr><td>none (0)</td><td>unknown (1)</td></tr><tr><td>Critical (1)</td><td>critical (4)</td></tr><tr><td>Error (2)</td><td>error (5)</td></tr><tr><td>Warning (3)</td><td>warning (6)</td></tr><tr><td>Informational (4)</td><td>info (8)</td></tr><tr><td>Debug (5)</td><td>debug (9)</td></tr></tbody></table>	Error log	FA-MIB	none (0)	unknown (1)	Critical (1)	critical (4)	Error (2)	error (5)	Warning (3)	warning (6)	Informational (4)	info (8)	Debug (5)	debug (9)
Error log	FA-MIB														
none (0)	unknown (1)														
Critical (1)	critical (4)														
Error (2)	error (5)														
Warning (3)	warning (6)														
Informational (4)	info (8)														
Debug (5)	debug (9)														
Note	See FcEventSeverity in <a href="#">Table 24</a> on page 215 for more information about severity.														

## connUnitEventType

OID	1.3.6.1.3.94.1.11.1.7
Description	The type of this event: <ul style="list-style-type: none"><li>• unknown (1)</li><li>• other (2)</li><li>• status (3)</li><li>• configuration (4)</li><li>• topology (5)</li></ul>
Note	Always set to 2 (other).

## connUnitEventObject

OID	1.3.6.1.3.94.1.11.1.8
Description	This is used with the connUnitEventType to identify the object to which the event refers. It can be the OID of a connectivity unit or of another object, like connUnitPortStatus[...].
Note	Always set to null.

## connUnitEventDescr

OID	1.3.6.1.3.94.1.11.1.9
Description	The description of the event.
Note	Same as the string displayed in the system error log. The system error log can be viewed using the <code>errShow</code> or <code>errDump</code> commands.
Note	For Fabric OS 4.4.0, the format of error messages has changed. This field now uses the message title and number (for example, WEBD-1006) and the message text. Previously, this field used the task ID and all of the message number and message text. For more information on error messages, see the <i>HP StorageWorks Fabric OS diagnostics and system error messages reference guide</i> .

## Connectivity unit link table

### connUnitLinkTable

OID	1.3.6.1.3.94.1.12
Description	A list of links known to this agent from this connectivity unit to other connectivity units: X is switch data and Y is other end.
Note	<p>The link table is intended to organize and communicate any information the agent has that might assist a management application to discover the connectivity units in the framework and the topology of their interconnect: the goal is to assist the management application by mapping the elements of the framework, in addition to listing them.</p> <p>With this goal, the agent should include as much information as it possesses about any links from its own connectivity units to others, including links among its own units.</p> <p>An agent should include partial information about links if it is not able to fully define them in accord with the following structure; however, the information must include either a nonzero <code>connUnitNodeId</code>—or a nonzero <code>connUnitPortWwn</code>—for each end of the link.</p> <p>If the agent is able to discover links that do not directly attach to members of its agency and its discovery algorithm gives some assurance that the links are recently valid, it might include these links.</p> <p>Link information entered by administrative action might be included, even if not validated directly, if the link has at least one endpoint in this agency, but it should not be included otherwise.</p> <p>A connectivity unit should fill in the table in as best it can. One of the methods for filling in the table would be to use the <code>RNID ELS</code> command (ANSI document 99-422v0). This command queries a port for the information needed for the link table.</p> <p>This table is accessed either directly, if the management software has an index value, or using <code>getNext</code>. The values of the indexes are not required to be contiguous. Each entry created in this table is assigned an index. This relationship is kept persistent until the entry is removed from the table or the system is reset. The total number of entries is defined by the size of the table.</p> <p>For an entry to be considered valid, both the X (local) and the Y (remote) values need to have one valid value.</p>

## connUnitLinkEntry

OID	1.3.6.1.3.94.1.12.1
Description	An entry describing a particular link to another.
Index	connUnitLinkId connUnitLinkIndex

## connUnitLinkId

OID	1.3.6.1.3.94.1.12.1.1
Description	The connUnitId of the connectivity unit that contains this link table.
Note	Set to WWN of the local switch.

## connUnitLinkIndex

OID	1.3.6.1.3.94.1.12.1.2
Description	This value is used to create a unique value for each entry in the link table with the same connUnitLinkId. The value can be reused only if it is not currently in use and the value is the next candidate to be used. This value is allowed to wrap at the highest value represented by the number of bits. This value is reset to 0 when the system is reset and the first value to be used is 1.
Note	Indexes 1 through <i>maximum number of ports</i> is reserved for ISL. Indexes <i>maximum number of ports + 1</i> and above are reserved for end devices and are calculated based on portID of the end devices.

## connUnitLinkNodeIDX

OID	1.3.6.1.3.94.1.12.1.3
Description	The node WWN of the unit at one end of the link. If the node WWN is unknown and the node is a connUnit in the responding agent, then the value of this object must be equal to its connUnitID.
Note	WWN of the local switch.

## connUnitLinkPortNumberX

OID	1.3.6.1.3.94.1.12.1.4
Description	The port number on the unit specified by connUnitLinkNodeIDX, if known; otherwise, -1. If the value is nonnegative, then it is equal to connUnitPortPhysicalNumber.
Note	ISL: Physical port number of the E_Port. Device: Physical port # to which the device is connected.

## connUnitLinkPortWwnX

OID	1.3.6.1.3.94.1.12.1.5
Description	The port WWN of the unit specified by connUnitLinkNodeIDX, if known; otherwise, 16 octets of binary 0.
Note	The WWN of the port to which the device is connected.

## connUnitLinkNodeIdY

OID	1.3.6.1.3.94.1.12.1.6
Description	The node WWN of the unit at the other end of the link. If the node WWN is unknown and the node is a connUnit in the responding SNMP agency, then the value of this object must be equal to its connUnitID.
Note	ISL: WWN of the remote switch. Device: Node name of the device.

## connUnitLinkPortNumberY

OID	1.3.6.1.3.94.1.12.1.7
Description	The port number on the unit specified by connUnitLinkNodeIdY, if known; otherwise, -1. If the value is nonnegative then it is equal to connUnitPortPhysicalNumber.
Note	ISL: Physical port number of the remote port. Device: -1.

## connUnitLinkPortWwnY

OID	1.3.6.1.3.94.1.12.1.8
Description	The port WWN on the unit specified by connUnitLinkNodeIdY, if known; otherwise, 16 octets of binary 0.
Note	ISL: WWN of the remote port. Device: <i>Port name</i> .

## connUnitLinkAgentAddressY

OID	1.3.6.1.3.94.1.12.1.9
Description	The address of an FCMGMT MIB agent for the node identified by connUnitLinkNodeIdY, if known; otherwise, 16 octets of binary 0.
Note	ISL: IP address (IPv4). Device: 0 (Null).

## connUnitLinkAgentAddressTypeY

OID	1.3.6.1.3.94.1.12.1.10
Description	If connUnitLinkAgentAddressY is nonzero, it is a protocol address. ConnUnitLinkAgentAddressTypeY is the address family number assigned by IANA to identify the address format (for example, 1 is Ipv4, 2 is Ipv6).
Note	ISL: Type 2. Device: 0 (Null).

## connUnitLinkAgentPortY

OID	1.3.6.1.3.94.1.12.1.11
Description	The IP port number for the agent. This is provided in case the agent is at a non-standard SNMP port.
Note	ISL: IP port. Device: 0 (Null).



## connUnitLinkUnitTypeY

OID	1.3.6.1.3.94.1.12.1.12
Description	Type of the FC connectivity unit, as defined in connUnitType. <ul style="list-style-type: none"><li>• ISL: Switch device.</li><li>• End devices: End device types based on an FCP Inquiry (See <a href="#">Table 25</a>).</li></ul> HP does not support Hubs.

**Table 25** connUnitLinkUnitTypeY end devices

Storage system	Storage subsystem	Unknown	Other
Direct Access	Medium Changer	Unknown	Anything else (printer device, processor device, scanner, and so forth)
Sequential Access	Array		
Write-Once	SES		
CD-ROM			
Optical			

## connUnitLinkConnIdY

OID	1.3.6.1.3.94.1.12.1.13
Description	The Fibre Channel ID of this port. If the connectivity unit is a switch, this is expected to be a Big Endian value of 24 bits. If this is loop, then it is the AL_PA that is connected. If this is an E_port, then it contains only the domain ID. If not any of those, unknown or cascaded loop, returns all bits set to 1.
Note	ISL: Port ID of the remote port. Device: Port ID of the remote port.

## connUnitLinkCurrIndex

Not supported in Fabric OS 2.6.1.	
OID	1.3.6.1.3.94.1.12.1.14
Description	The last-used link index.

## Statistics group

Not supported in Fabric OS 2.6.1.

Port types are aggregated into a port type class, such as all the fabric port types.

Each individual port has only one statistics table. For all objects in the statistics table, if the object is not supported by the conn unit, then the high order bit is set to 1, with all other bits set to 0 (for example, the last eight bytes of the returned value might be ...:80 00 00 00 00 00 00 00).

The high order bit is reserved to indicate whether the object is supported. All objects start at a value of 0 at hardware initialization and continue incrementing until end of 63 bits and then wrap to 0.

The case for all Class 1 Frames; HP does not support them.

## connUnitPortStatTable

OID	1.3.6.1.3.94.4.5
Description	A list of statistics for the fabric port types.

### connUnitPortStatEntry

OID	1.3.6.1.3.94.4.5.1
Description	An entry describing port statistics.
Index	connUnitPortStatUnitId connUnitPortStatIndex

### connUnitPortStatUnitId

OID	1.3.6.1.3.94.4.5.1.1
Description	The connUnitId of the connectivity unit that contains this port statistics table.

### connUnitPortStatIndex

OID	1.3.6.1.3.94.4.5.1.2
Description	A unique value among all entries in this table, between 0 and connUnitNumPort[connUnitPortUnitId].

### connUnitPortStatCountError

OID	1.3.6.1.3.94.4.5.1.3
Description	A count of the errors that have occurred on this port.

### connUnitPortStatCountTxObjects

OID	1.3.6.1.3.94.4.5.1.4
Description	The number of frames, packets, I/Os, and so forth, that have been transmitted by this port.
Note	A Fibre Channel frame starts with SOF and ends with EOF. FC loop devices should not count frames passed through. This value represents the sum total for all other Tx objects.

### connUnitPortStatCountRxObjects

OID	1.3.6.1.3.94.4.5.1.5
Description	The number of frames, packets, IOs, and so forth, that have been received by this port.
Note	A Fibre Channel frame starts with SOF and ends with EOF. FC loop devices should not count frames passed through. This value represents the sum total for all other Rx objects.

### connUnitPortStatCountTxElements

OID	1.3.6.1.3.94.4.5.1.6
Description	The number of octets or bytes that have been transmitted by this port. There is a one-second periodic polling of the port. This value is saved and compared with the next polled value to compute net throughput.
Note	For Fibre Channel, ordered sets are not included in the count.

### connUnitPortStatCountRxElements

OID	1.3.6.1.3.94.4.5.1.7
Description	The number of octets or bytes that have been received by this port. There is a one-second periodic polling of the port. This value is saved and compared with the next polled value to compute net throughput.
Note	For Fibre Channel, ordered sets are not included in the count.

### connUnitPortStatCountBBCreditZero

OID	1.3.6.1.3.94.4.5.1.8
Description	The number of transitions in/out of BB credit zero state. The other side is not providing any credit.
Note	This is a Fibre Channel statistic only.

### connUnitPortStatCountInputBuffersFull

Not supported.	
OID	1.3.6.1.3.94.4.5.1.9
Description	The number of occurrences when all input buffers of a port were full and outbound buffer-to-buffer credit transitioned to 0. There is no credit to provide to other side.  Return Value: 80 0 0 0 0 0 0 0 (Not Supported)
Note	This is a Fibre Channel statistic only.

### connUnitPortStatCountFBSYFrames

OID	1.3.6.1.3.94.4.5.1.10
Description	The number of times that FBSY was returned to this port as a result of a frame that could not be delivered to the other end of the link. This occurs if either the Fabric or the destination port is temporarily busy. Port can occur only on SOFc1 frames (the frames that establish a connection).
Note	This is a Fibre Channel only statistic; the sum of all classes. If you cannot keep the by-class counters, then keep the sum counters.

### connUnitPortStatCountPBSYFrames

Not supported.	
OID	1.3.6.1.3.94.4.5.1.11
Description	The number of times that PBSY was returned to this port as a result of a frame that could not be delivered to the other end of the link. This occurs if the destination port is temporarily busy. PBSY can occur only on SOFc1 frames (the frames that establish a connection).  Return Value: 80 0 0 0 0 0 0 0 (not supported)
Note	This is a Fibre Channel only statistic; the sum of all classes. If you cannot keep the by class counters, then keep the sum counters.

### connUnitPortStatCountFRJTFrames

OID	1.3.6.1.3.94.4.5.1.12
Description	The number of times that FRJT was returned to this port as a result of a frame that was rejected by the fabric.
Note	This is the total for all classes and is a Fibre Channel statistic only.

### connUnitPortStatCountPRJTFrames

Not supported.	
OID	1.3.6.1.3.94.4.5.1.13
Description	The number of times that PRJT was returned to this port as a result of a frame that was rejected at the destination N_Port.  Return Value: 80 0 0 0 0 0 0
Note	This is the total for all classes and is a Fibre Channel statistic only.

### connUnitPortStatCountClass1RxFrames

OID	1.3.6.1.3.94.4.5.1.14
Description	The number of Class 1 Frames received at this port.
Note	This is a Fibre Channel statistic only. HP does not support Class 1 Frames.

### connUnitPortStatCountClass1TxFrames

OID	1.3.6.1.3.94.4.5.1.15
Description	The number of Class 1 Frames transmitted out this port.
Note	This is a Fibre Channel statistic only. HP does not support Class 1 Frames.

### connUnitPortStatCountClass1FBSYFrames

OID	1.3.6.1.3.94.4.5.1.16
Description	The number of times that FBSY was returned to this port as a result of a Class 1 Frame that could not be delivered to the other end of the link. This occurs if either the Fabric or the destination port is temporarily busy. FBSY can occur only on SOFc1 frames (the frames that establish a connection).
Note	This is a Fibre Channel statistic only. HP does not support Class 1 Frames.

### connUnitPortStatCountClass1PBSYFrames

OID	1.3.6.1.3.94.4.5.1.17
Description	The number of times that PBSY was returned to this port as a result of a Class 1 Frame that could not be delivered to the other end of the link. This occurs if the destination N_Port is temporarily busy. PBSY can occur only on SOFc1 frames (the frames that establish a connection).
Note	This is a Fibre Channel statistic only. HP does not support Class 1 Frames.

### connUnitPortStatCountClass1FRJTFrames

OID	1.3.6.1.3.94.4.5.1.18
Description	The number of times that FRJT was returned to this port as a result of a Class 1 Frame that was rejected by the fabric.
Note	This is a Fibre Channel statistic only. HP does not support Class 1 Frames.

### connUnitPortStatCountClass1PRJTFrames

OID	1.3.6.1.3.94.4.5.1.19
Description	The number of times that PRJT was returned to this port as a result of a Class 1 Frame that was rejected at the destination N_Port.
Note	This is a Fibre Channel statistic only. HP does not support Class 1 Frames.

### connUnitPortStatCountClass2RxFrames

OID	1.3.6.1.3.94.4.5.1.20
Description	The number of Class 2 Frames received at this port.
Note	This is a Fibre Channel statistic only.

### connUnitPortStatCountClass2TxFrames

Not supported.	
OID	1.3.6.1.3.94.4.5.1.21
Description	The number of Class 2 Frames transmitted out this port. Return value: 80 0 0 0 0 0 0 0
Note	This is a Fibre Channel statistic only.

### connUnitPortStatCountClass2FBSYFrames

Not supported.	
OID	1.3.6.1.3.94.4.5.1.22
Description	The number of times that FBSY was returned to this port as a result of a Class 2 Frame that could not be delivered to the other end of the link. This occurs if either the Fabric or the destination port is temporarily busy. FBSY can occur only on SOFc1 frames (the frames that establish a connection). Return value: 80 0 0 0 0 0 0 0
Note	This is a Fibre Channel statistic only.

### connUnitPortStatCountClass2PBSYFrames

Not supported.

OID 1.3.6.1.3.94.4.5.1.23

Description The number of times that PBSY was returned to this port as a result of a Class 2 Frame that could not be delivered to the other end of the link. This occurs if the destination N\_Port is temporarily busy. PBSY can occur only on SOFc1 frames (the frames that establish a connection).

Return value: 80 0 0 0 0 0 0 0

Note This is a Fibre Channel statistic only.

### connUnitPortStatCountClass2FRJTFrames

Not supported.

OID 1.3.6.1.3.94.4.5.1.24

Description The number of times that FRJT was returned to this port as a result of a Class 2 Frame that was rejected by the fabric.

Return value: 80 0 0 0 0 0 0 0

Note This is a Fibre Channel statistic only.

### connUnitPortStatCountClass2PRJTFrames

OID 1.3.6.1.3.94.4.5.1.25

Description The number of times that PRJT was returned to this port as a result of a Class 2 Frame that was rejected at the destination N\_Port.

Return value: 80 0 0 0 0 0 0 0 (not supported)

Note This is a Fibre Channel statistic only.

### connUnitPortStatCountClass3RxFrames

OID 1.3.6.1.3.94.4.5.1.26

Description The number of Class 3 Frames received at this port.

Note This is a Fibre Channel statistic only.

### connUnitPortStatCountClass3TxFrames

OID 1.3.6.1.3.94.4.5.1.27

Description The number of Class 3 Frames transmitted out this port.

Note This is a Fibre Channel statistic only.

### connUnitPortStatCountClass3Discards

OID 1.3.6.1.3.94.4.5.1.28

Description The number of Class 3 Frames that were discarded upon reception at this port. There is no FBSY or FRJT generated for Class 3 Frames. They are discarded if they cannot be delivered.

Note This is a Fibre Channel statistic only.

### connUnitPortStatCountRxMulticastObjects

OID	1.3.6.1.3.94.4.5.1.29
Description	The number of multicast frames or packets received at this port.

### connUnitPortStatCountTxMulticastObjects

OID	1.3.6.1.3.94.4.5.1.30
Description	The number of multicast frames or packets transmitted out this port.

### connUnitPortStatCountRxBroadcastObjects

OID	1.3.6.1.3.94.4.5.1.31
Description	The number of broadcast frames or packets received at this port. Return value: 80 0 0 0 0 0 0 0 (not supported)

### connUnitPortStatCountTxBroadcastObjects

OID	1.3.6.1.3.94.4.5.1.32
Description	The number of broadcast frames or packets transmitted out from this port. On a Fibre Channel loop, count only OPN <sub>r</sub> frames generated. Return value: 80 0 0 0 0 0 0 0 (not supported)

### connUnitPortStatCountRxLinkResets

OID	1.3.6.1.3.94.4.5.1.33
Description	The number of link resets. The number of LR <sub>s</sub> received.
Note	This is a Fibre Channel statistic only.

### connUnitPortStatCountTxLinkResets

OID	1.3.6.1.3.94.4.5.1.34
Description	The number of link resets. The number LR <sub>s</sub> transmitted.
Note	This is a Fibre Channel statistic only.

### connUnitPortStatCountNumberLinkResets

OID	1.3.6.1.3.94.4.5.1.35
Description	The number of link resets and LIP <sub>s</sub> detected at this port. The number of times the reset link protocol has been initiated. This is a count of the logical resets, a count of the number of primitives.
Note	This is a Fibre Channel statistic only.

### connUnitPortStatCountRxOfflineSequences

OID	1.3.6.1.3.94.4.5.1.36
Description	The number of offline primitive OLS received at this port.
Note	This is a Fibre Channel statistic only.

### connUnitPortStatCountTxOfflineSequences

OID	1.3.6.1.3.94.4.5.1.37
Description	The number of offline primitive OLS transmitted by this port.
Note	This is a Fibre Channel statistic only.

### connUnitPortStatCountNumberOfflineSequences

OID	1.3.6.1.3.94.4.5.1.38
Description	The number of offline primitive sequence received at this port. Return Value: 80 0 0 0 0 0 0 0 (not supported)
Note	This is a Fibre Channel statistic only.

### connUnitPortStatCountLinkFailures

OID	1.3.6.1.3.94.4.5.1.39
Description	The number of link failures. This count is part of the Link Error Status Block (LESB). (FC-PH 29.8)
Note	This is a Fibre Channel statistic only.

### connUnitPortStatCountInvalidCRC

OID	1.3.6.1.3.94.4.5.1.40
Description	The number of frames received with invalid CRC. This count is part of the Link Error Status Block (LESB). (FC-PH 29.8) Loop ports should not count CRC errors passing through when monitoring.
Note	This is a Fibre Channel statistic only.

### connUnitPortStatCountInvalidTxWords

OID	1.3.6.1.3.94.4.5.1.41
Description	The number of invalid transmission words received at this port. This count is part of the LWSB. (FC-PH 29.8)
Note	This is a Fibre Channel statistic only.

### connUnitPortStatCountPrimitiveSequenceProtocolErrors

OID	1.3.6.1.3.94.4.5.1.42
Description	The number of primitive sequence protocol errors detected at this port. This count is part of the LESB. (FC-PH 29.8)
Note	This is a Fibre Channel statistic only.



### connUnitPortStatCountLossofSignal

OID	1.3.6.1.3.94.4.5.1.43
Description	The number of instances of signal loss detected at this port. This count is part of the LESB. (FC-PH 29.8)
Note	This is a Fibre Channel statistic only.

### connUnitPortStatCountLossofSynchronization

OID	1.3.6.1.3.94.4.5.1.44
Description	The number of instances of synchronization loss detected at this port. This count is part of the LESB. (FC-PH 29.8)
Note	This is a Fibre Channel statistic only.

### connUnitPortStatCountInvalidOrderedSets

OID	1.3.6.1.3.94.4.5.1.45
Description	The number of invalid ordered sets received at this port. This count is part of the LESB. (FC-PH 29.8).
Note	This is a Fibre Channel statistic only.

### connUnitPortStatCountFramesTooLong

OID	1.3.6.1.3.94.4.5.1.46
Description	The number of frames received at this port where the frame length was greater than what was agreed to in FLOGI/PLOGI. This could be caused by losing the end of frame delimiter.
Note	This is a Fibre Channel statistic only.

### connUnitPortStatCountFramesTruncated

OID	1.3.6.1.3.94.4.5.1.47
Description	The number of frames received at this port where the frame length was less than the minimum indicated by the frame header—normally 24 bytes, but it could be more if the DFCTL field indicates that an optional header should have been present.
Note	This is a Fibre Channel statistic only.

### connUnitPortStatCountAddressErrors

OID	1.3.6.1.3.94.4.5.1.48
Description	The number of frames received with unknown addressing. For example, when the SID or DID is not known to the routing algorithm.
Note	This is a Fibre Channel statistic only.

### connUnitPortStatCountDelimiterErrors

OID	1.3.6.1.3.94.4.5.1.49
Description	The number of invalid frame delimiters received at this port. An example is a frame with a class 2 start and a class 3 at the end.
Note	This is a Fibre Channel statistic only.

### connUnitPortStatCountEncodingDisparityErrors

OID	1.3.6.1.3.94.4.5.1.50
Description	The number of disparity errors received at this port.
Note	This is a Fibre Channel statistic only.

## Service group

Not supported in Fabric OS 2.6.1.

Implementation of the Service group is mandatory for all systems.

The Service group contains the following subgroups:

- Connectivity Unit Service Scalers Group
- Connectivity Unit Service Tables Group

## Connectivity unit service scalars group

Implementation of the Connectivity unit service scalars group is mandatory for all systems.

### connUnitSnsMaxEntry

OID	1.3.6.1.3.94.5.1.1
Description	The maximum number of entries in the table.

## Connectivity unit service tables group

Implementation of the Connectivity Unit Service Tables group is mandatory for all systems.

### connUnitSnsTable

OID	1.3.6.1.3.94.5.2.1
Description	This table contains an entry for each object registered with this port in the switch.

### connUnitSnsEntry

OID	1.3.6.1.3.94.5.2.1.1
Description	The simple name server (SNS) table for the port represented by connUnitSnsPortIndex.
Index	connUnitSnsId connUnitSnsPortIndex connUnitSnsPortIdentifier

### connUnitSnsId

OID	1.3.6.1.3.94.5.2.1.1.1
Description	The connUnitId of the connectivity unit that contains this name server table.

### connUnitSnsPortIndex

OID	1.3.6.1.3.94.5.2.1.1.2
Description	The physical port number of this SNS table entry. Each physical port has an SNS table with 1-n entries indexed by connUnitSnsPortIdentifier (port address).

### connUnitSnsPortIdentifier

OID	1.3.6.1.3.94.5.2.1.1.3
Description	The port identifier for this entry in the SNS table.

### connUnitSnsPortName

OID	1.3.6.1.3.94.5.2.1.1.4
Description	The port name for this entry in the SNS table.

### connUnitSnsNodeName

OID	1.3.6.1.3.94.5.2.1.1.5
Description	The node name for this entry in the SNS table.

### connUnitSnsClassOfSvc

OID	1.3.6.1.3.94.5.2.1.1.6
Description	The Classes of Service offered by this entry in the SNS table.

### connUnitSnsNodeIPAddress

OID	1.3.6.1.3.94.5.2.1.1.7
Description	The IPv6 formatted address of the Node for this entry in the SNS table.

### connUnitSnsProcAssoc

OID	1.3.6.1.3.94.5.2.1.1.8
Description	The process associator for this entry in the SNS table.

### connUnitSnsFC4Type

OID	1.3.6.1.3.94.5.2.1.1.9
Description	The FC-4 types supported by this entry in the SNS table.

### connUnitSnsPortType

OID	1.3.6.1.3.94.5.2.1.1.10
Description	The port type of this entry in the SNS table.

### connUnitSnsPortIPAddress

OID	1.3.6.1.3.94.5.2.1.1.11
Description	The IPv6 formatted address of this entry in the SNS table.

### connUnitSnsFabricPortName

OID	1.3.6.1.3.94.5.2.1.1.12
Description	The fabric port name of this entry in the SNS table.

### connUnitSnsHardAddress

OID	1.3.6.1.3.94.5.2.1.1.13
Description	The hard address of this entry in the SNS table.

### connUnitSnsSymbolicPortName

OID	1.3.6.1.3.94.5.2.1.1.14
Description	The symbolic port name of this entry in the SNS table.

### connUnitSnsSymbolicNodeName

OID	1.3.6.1.3.94.5.2.1.1.15
Description	The symbolic node name of this entry in the SNS table.

## SNMP trap registration group

This section discusses the trapMaxClients MIBs.

### trapMaxClients

OID	1.3.6.1.3.94.2.1
Description	The maximum number of SNMP trap recipients supported by the connectivity unit.
Note	Set to 6.

### trapClientCount

OID	1.3.6.1.3.94.2.2
Description	The current number of rows in the trap table.

### trapRegTable

OID	1.3.6.1.3.94.2.3
Description	A table containing a row for each IP address/port number to which traps are sent.

## trapRegEntry

OID	1.3.6.1.3.94.2.3.1
Description	IP/port pair for a specific client.
Index	trapRegIpAddress trapRegPort

## trapRegIpAddress

OID	1.3.6.1.3.94.2.3.1.1
Description	The IP address of a client registered for traps.

## trapRegPort

OID	1.3.6.1.3.94.2.3.1.2
Description	The UDP port to send traps to for this host. Normally this would be the standard trap port (162). This object is an index and must be specified to create a row in this table.
Note	Set to 162.

## trapRegFilter

OID	1.3.6.1.3.94.2.3.1.3														
Description	This value defines the trap severity filter for this trap host. The connUnit sends traps to this host that have a severity level less than or equal to this value. The default value of this object is Warning. The mapping between errorlog severity level and this variable is: <table><thead><tr><th>Error log</th><th>FA-MIB</th></tr></thead><tbody><tr><td>none (0)</td><td>unknown (1)</td></tr><tr><td>Critical (1)</td><td>critical (4)</td></tr><tr><td>Error (2)</td><td>error (5)</td></tr><tr><td>Warning (3)</td><td>warning (6)</td></tr><tr><td>Informational (4)</td><td>info (8)</td></tr><tr><td>Debug (5)</td><td>debug (9)</td></tr></tbody></table>	Error log	FA-MIB	none (0)	unknown (1)	Critical (1)	critical (4)	Error (2)	error (5)	Warning (3)	warning (6)	Informational (4)	info (8)	Debug (5)	debug (9)
Error log	FA-MIB														
none (0)	unknown (1)														
Critical (1)	critical (4)														
Error (2)	error (5)														
Warning (3)	warning (6)														
Informational (4)	info (8)														
Debug (5)	debug (9)														
Note	This severity applies to all entries. See FcEventSeverity in <a href="#">Table 24</a> on page 215. The values 1, 3, 7, and 10 are not valid for SET operations.														

## trapRegRowState

OID	1.3.6.1.3.94.2.3.1.4
Description	Specifies the state of the row. This entry always returns rowActive and allows for read-only. <a href="#">Table 26</a> provides read/write descriptions.

**Table 26** TrapRegRowState for read/write

State	Read description	Write description
rowDestroy (1)	Read: Can never happen.	Write: Remove this row from the table.
rowInactive (2)	Read: Indicates that this row does exist but that traps are not enabled to be sent to the target.	Write: If the row does not exist and the agent allows writes to the trap table, then a new row is created. The values of the optional columns are set to default values. Traps are not enabled to be sent to the target. If the row already existed, then traps are disabled from being sent to the target.
rowActive (3)	Read: Indicates that this row exists and that traps are enabled to be sent to the target.	Write: If the row does not exist and the agent allows writes to the trap table, then a new row is created. The values of the optional columns are set to default values. Traps are enabled to be sent to the target. If the row already exists, then traps are enabled to be sent to the target.

## Revision number scalar

### revisionNumber

OID 1.3.6.1.3.94.3

Description The revision number for this MIB. The format of the revision value is as follows:

- 0 = High order major revision number
- 1 = Low order major revision number
- 2 = High order minor revision number
- 3 = Low order minor revision number

The value is stored as an ASCII value. The following is the current value of this object:

- 0 = 0
- 1 = 3
- 2 = 0
- 3 = 0

This example defines a revision of 03.00.

Note Set to 0300.

## Unsupported tables

The Connectivity Unit Port Statistics Fabric Table is supported only in Fabric OS 2.6.1.

HP does not support the following tables:

- Connectivity Unit Port Statistics Hub Table
- Connectivity Unit Port Statistics SCSI Table
- Connectivity Unit Port Statistics LAN/WAN Table

## Unsupported traps

### connUnitStatusChange

Enterprise	fcmgmt
Variables	connUnitStatus, connUnitState
Description	The overall status of the connectivity unit has changed. Recommended severity level (for filtering): alert.
Note	Generated when connUnitStatus changes. See " <a href="#">connUnitStatus</a> " on page 220 to see how the value is calculated. Sample trap output for Fabric OS 4.4.0: <pre>connUnitStatus.16.0.0.96.105.144.109.136.0.0.0.0.0.0.0.0.1 = warning(4) connUnitState.16.0.0.96.105.144.109.136.0.0.0.0.0.0.0.0.1 = offline(3)</pre> See the <i>HP StorageWorks Fabric OS 5.x Fabric Watch administrator guide</i> to see how the switch status is determined.

### connUnitDeletedTrap

Enterprise	fcmgmt
Variables	connUnitId
Description	A connUnit has been deleted from this agent. Recommended severity level (for filtering): warning.
Note	Not implemented.

### connUnitEventTrap

Enterprise	fcmgmt
Variables	connUnitEventId, connUnitEventType, connUnitEventObject, connUnitEventDescr
Description	An event has been generated by the connectivity unit. Recommended severity level (for filtering): info. Sample trap output for Fabric OS 4.4.0: <pre>connUnitEventId.16.0.0.96.105.144.109.136.0.0.0.0.0.0.0.0.354 = 354 connUnitEventType.16.0.0.96.105.144.109.136.0.0.0.0.0.0.0.0.354 = other(2) connUnitEventObject.16.0.0.96.105.144.109.136.0.0.0.0.0.0.0.0.354 = null connUnitEventDescr.16.0.0.96.105.144.109.136.0.0.0.0.0.0.0.0.354 = FW-1425 Switch status changed from MARGINAL to HEALTHY.</pre> See the <a href="#">swEventTrap</a> for more details.

## connUnitSensorStatusChange

Enterprise	fcmgmt
Variables	connUnitSensorStatus
Description	Overall status of the connectivity unit has changed.
Note	This trap is generated whenever the status of the sensors (like fan, power supply, temperature) present in the connectivity unit changes.

Sample trap output for Fabric OS 4.4.0:

```
connUnitSensorStatus.16.0.0.96.105.144.109.136.0.0.0.0.0.0.0.0.7 = failed(5)
```

See the *HP StorageWorks Fabric OS 5.x Fabric Watch administrator guide* for information on configuring thresholds that generate these traps.

## connUnitPortStatusChange

Enterprise	fcmgmt
Variables	connUnitPortStatus, connUnitPortState
Description	Overall status of the connectivity unit changed. Recommended severity level (for filtering): alert.
Note	This trap sends the instance of connUnitPortName as part of the trap; the instance string is NULL, if the port name is not defined for the specified port.

Sample trap output for Fabric OS 4.4.0:

```
connUnitPortStatus.16.0.0.96.105.144.109.136.0.0.0.0.0.0.0.0.29 = ready(3)
connUnitPortState.16.0.0.96.105.144.109.136.0.0.0.0.0.0.0.0.29 = online(2)
connUnitPortName.16.0.0.96.105.144.109.136.0.0.0.0.0.0.0.0.29 = test
```

See the [swFCPortScn](#) for more information.



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# A MIB object groupings

This appendix provides a function-based listing of MIB objects. To see the correlation of various switch objects to MIB objects, including the following:

- [Switch variables](#) next
- [Sensor variables](#), page 257
- [Port variables](#), page 257
- [Event variables](#), page 258
- [ISL and end device variables](#), page 258
- [SNMP configuration variables](#), page 258

## Switch variables

MIB variables that assist in monitoring or modifying the status of switches are in the following tables or groups:

- [Connectivity unit table](#), page 217
- [Connectivity unit revisions table](#), page 224
- [FIBRE-CHANNEL-FE-MIB organization](#), page 68
- [FCFABRIC-ELEMENT-MIB organization](#), page 90
- [Flash administration](#), page 149

## Sensor variables

MIB variables that assist in monitoring or modifying the status/state of fans, power supply, and temperature are found in the following tables or groups:

- [Connectivity unit sensor table](#), page 225
- [swNumSensors](#), page 151

## Port variables

MIB variables that assist in monitoring or modifying ports are found in the following tables or groups:

### Variables for state and status

- [Connectivity unit port table](#), page 227
- [Fx\\_Port table](#), page 76
- [Fx\\_Port configuration table](#), page 98
- [Fx\\_Port status table](#), page 78
- [Fx\\_Port operation table](#), page 101
- [Fx\\_Port physical level table](#), page 79
- [Fx\\_Port capability table](#), page 88
- [Fibre Channel port group](#), page 159

### Variables for statistics and measurement

- [Statistics group](#), page 241
- [Fx\\_Port error table](#), page 83
- [Class 2 accounting table](#), page 86
- [fcFeCapability group](#), page 88

## Event variables

MIB variables that assist in monitoring or modifying events are found in the following tables or groups:

- [Connectivity unit event table](#), page 235
- [Event group](#), page 167

## ISL and end device variables

MIB variables that assist in monitoring or modifying ISL and end-devices are found in the following tables or groups:

### ISL variables

- [Connectivity unit link table](#), page 238
- [swFabric group](#), page 154

### End device variables

- [Connectivity unit link table](#), page 238
- [Fx\\_Port fabric login table](#), page 80
- [swFCPortName](#), page 164

## SNMP configuration variables

MIB variables that assist in configuring SNMP are found in the following tables or groups:

- [trapRegTable](#), page 252
- [SW agent configuration group](#), page 158

## B MIB OIDs and their matching object names

This appendix provides a listing of the 3.1.x MIB object names and the corresponding MIB Object ID (OID) associated with each.

### MIB OIDs

The following matrix allows you to identify a MIB object name according to its related OID.

**Table 27** MIB object name and OID matrix

MIB Object Name	OID	Page
iso	1	68
org	1.3	68
dod	1.3.6	68
internet	1.3.6.1	68
directory	1.3.6.1.1	35
mgmt	1.3.6.1.2	68
mib-2	1.3.6.1.2.1	68
fcFeMIB	1.3.6.1.2.1.75	68
fcFeMIBObjects	1.3.6.1.2.1.75.1	68
fcFeConfig	1.3.6.1.2.1.75.1.1	68
fcFeFabricName	1.3.6.1.2.1.75.1.1.1	74
fcFeElementName	1.3.6.1.2.1.75.1.1.2	74
fcFeModuleCapacity	1.3.6.1.2.1.75.1.1.3	74
fcFeModuleTable	1.3.6.1.2.1.75.1.1.4	74
fcFeModuleEntry	1.3.6.1.2.1.75.1.1.4.1	74
fcFeModuleIndex	1.3.6.1.2.1.75.1.1.4.1.1	74
fcFeModuleDescr	1.3.6.1.2.1.75.1.1.4.1.2	75
fcFeModuleObjectID	1.3.6.1.2.1.75.1.1.4.1.3	75
fcFeModuleOperStatus	1.3.6.1.2.1.75.1.1.4.1.4	75
fcFeModuleLastChange	1.3.6.1.2.1.75.1.1.4.1.5	75
fcFeModuleFxpPortCapacity	1.3.6.1.2.1.75.1.1.4.1.6	75
fcFeModuleName	1.3.6.1.2.1.75.1.1.4.1.7	76
fcFxpPortTable	1.3.6.1.2.1.75.1.1.5	76
fcFxpPortEntry	1.3.6.1.2.1.75.1.1.5.1	76
fcFxpPortIndex	1.3.6.1.2.1.75.1.1.5.1.1	76
fcFxpPortName	1.3.6.1.2.1.75.1.1.5.1.2	76
fcFxpPortFcphVersionHigh	1.3.6.1.2.1.75.1.1.5.1.3	76
fcFxpPortFcphVersionLow	1.3.6.1.2.1.75.1.1.5.1.4	76
fcFxpPortBbCredit	1.3.6.1.2.1.75.1.1.5.1.5	77
fcFxpPortRxBufSize	1.3.6.1.2.1.75.1.1.5.1.6	77
fcFxpPortRatov	1.3.6.1.2.1.75.1.1.5.1.7	77
fcFxpPortEdtov	1.3.6.1.2.1.75.1.1.5.1.8	77

**Table 27** MIB object name and OID matrix (continued)

MIB Object Name	OID	Page
fcFxPortCosSupported	1.3.6.1.2.1.75.1.1.5.1.9	<a href="#">77</a>
fcFxPortIntermixSupported	1.3.6.1.2.1.75.1.1.5.1.10	<a href="#">77</a>
fcFxPortStackedConnMode	1.3.6.1.2.1.75.1.1.5.1.11	<a href="#">77</a>
fcFxPortClass2SeqDeliv	1.3.6.1.2.1.75.1.1.5.1.12	<a href="#">77</a>
fcFxPortClass3SeqDeliv	1.3.6.1.2.1.75.1.1.5.1.13	<a href="#">78</a>
fcFxPortHoldTime	1.3.6.1.2.1.75.1.1.5.1.14	<a href="#">78</a>
fcFeStatus	1.3.6.1.2.1.75.1.2	<a href="#">69</a>
fcFxPortStatusTable	1.3.6.1.2.1.75.1.2.1	<a href="#">78</a>
fcFxPortStatusEntry	1.3.6.1.2.1.75.1.2.1.1	<a href="#">78</a>
fcFxPortID	1.3.6.1.2.1.75.1.2.1.1.1	<a href="#">78</a>
fcFxPortBbCreditAvailable	1.3.6.1.2.1.75.1.2.1.1.2	<a href="#">78</a>
fcFxPortOperMode	1.3.6.1.2.1.75.1.2.1.1.3	<a href="#">79</a>
fcFxPortAdminMode	1.3.6.1.2.1.75.1.2.1.1.4	<a href="#">79</a>
fcFxPortPhysTable	1.3.6.1.2.1.75.1.2.2	<a href="#">79</a>
fcFxPortPhysEntry	1.3.6.1.2.1.75.1.2.2.1	<a href="#">79</a>
fcFxPortPhysAdminStatus	1.3.6.1.2.1.75.1.2.2.1.1	<a href="#">79</a>
fcFxPortPhysOperStatus	1.3.6.1.2.1.75.1.2.2.1.2	<a href="#">80</a>
fcFxPortPhysLastChange	1.3.6.1.2.1.75.1.2.2.1.3	<a href="#">80</a>
fcFxPortPhysRttov	1.3.6.1.2.1.75.1.2.2.1.4	<a href="#">80</a>
fcFxLoginTable	1.3.6.1.2.1.75.1.2.3	<a href="#">80</a>
fcFxLoginEntry	1.3.6.1.2.1.75.1.2.3.1	<a href="#">80</a>
fcFxPortNxLoginIndex	1.3.6.1.2.1.75.1.2.3.1.1	<a href="#">80</a>
fcFxPortFcphVersionAgreed	1.3.6.1.2.1.75.1.2.3.1.2	<a href="#">81</a>
fcFxPortNxPortBbCredit	1.3.6.1.2.1.75.1.2.3.1.3	<a href="#">81</a>
fcFxPortNxPortRxDataFieldSize	1.3.6.1.2.1.75.1.2.3.1.4	<a href="#">81</a>
fcFxPortCosSuppAgreed	1.3.6.1.2.1.75.1.2.3.1.5	<a href="#">81</a>
fcFxPortIntermixSuppAgreed	1.3.6.1.2.1.75.1.2.3.1.6	<a href="#">81</a>
fcFxPortStackedConnModeAgreed	1.3.6.1.2.1.75.1.2.3.1.7	<a href="#">81</a>
fcFxPortClass2SeqDelivAgreed	1.3.6.1.2.1.75.1.2.3.1.8	<a href="#">82</a>
fcFxPortClass3SeqDelivAgreed	1.3.6.1.2.1.75.1.2.3.1.9	<a href="#">82</a>
fcFxPortNxPortName	1.3.6.1.2.1.75.1.2.3.1.10	<a href="#">82</a>
fcFxPortConnectedNxPort	1.3.6.1.2.1.75.1.2.3.1.11	<a href="#">82</a>
fcFxPortBbCreditModel	1.3.6.1.2.1.75.1.2.3.1.12	<a href="#">82</a>
fcFeError	1.3.6.1.2.1.75.1.3	<a href="#">69</a>
fcFxPortErrorTable	1.3.6.1.2.1.75.1.3.1	<a href="#">83</a>
fcFxPortErrorEntry	1.3.6.1.2.1.75.1.3.1.1	<a href="#">83</a>
fcFxPortLinkFailures	1.3.6.1.2.1.75.1.3.1.1.1	<a href="#">83</a>
fcFxPortSyncLosses	1.3.6.1.2.1.75.1.3.1.1.2	<a href="#">83</a>
fcFxPortSigLosses	1.3.6.1.2.1.75.1.3.1.1.3	<a href="#">83</a>

**Table 27** MIB object name and OID matrix (continued)

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fcFxPortPrimSeqProtoErrors	1.3.6.1.2.1.75.1.3.1.1.4	<a href="#">83</a>
fcFxPortInvalidTxWords	1.3.6.1.2.1.75.1.3.1.1.5	<a href="#">83</a>
fcFxPortInvalidCrcs	1.3.6.1.2.1.75.1.3.1.1.6	<a href="#">83</a>
fcFxPortDelimiterErrors	1.3.6.1.2.1.75.1.3.1.1.7	<a href="#">84</a>
fcFxPortAddressIdErrors	1.3.6.1.2.1.75.1.3.1.1.8	<a href="#">84</a>
fcFxPortLinkResetIns	1.3.6.1.2.1.75.1.3.1.1.9	<a href="#">84</a>
fcFxPortLinkResetOuts	1.3.6.1.2.1.75.1.3.1.1.10	<a href="#">84</a>
fcFxPortOlsIns	1.3.6.1.2.1.75.1.3.1.1.11	<a href="#">84</a>
fcFxPortOlsOuts	1.3.6.1.2.1.75.1.3.1.1.12	<a href="#">84</a>
fcFeAccounting	1.3.6.1.2.1.75.1.4	<a href="#">70</a>
fcFxPortC1AccountingTable	1.3.6.1.2.1.75.1.4.1	<a href="#">84</a>
fcFxPortC1AccountingEntry	1.3.6.1.2.1.75.1.4.1.1	<a href="#">85</a>
fcFxPortC1InFrames	1.3.6.1.2.1.75.1.4.1.1.1	<a href="#">85</a>
fcFxPortC1OutFrames	1.3.6.1.2.1.75.1.4.1.1.2	<a href="#">85</a>
fcFxPortC1InOctets	1.3.6.1.2.1.75.1.4.1.1.3	<a href="#">85</a>
fcFxPortC1OutOctets	1.3.6.1.2.1.75.1.4.1.1.4	<a href="#">85</a>
fcFxPortC1Discards	1.3.6.1.2.1.75.1.4.1.1.5	<a href="#">85</a>
fcFxPortC1FbsyFrames	1.3.6.1.2.1.75.1.4.1.1.6	<a href="#">85</a>
fcFxPortC1FrjtFrames	1.3.6.1.2.1.75.1.4.1.1.7	<a href="#">85</a>
fcFxPortC1InConnections	1.3.6.1.2.1.75.1.4.1.1.8	<a href="#">85</a>
fcFxPortC1OutConnections	1.3.6.1.2.1.75.1.4.1.1.9	<a href="#">86</a>
fcFxPortC1ConnTime	1.3.6.1.2.1.75.1.4.1.1.10	<a href="#">86</a>
fcFxPortC2AccountingTable	1.3.6.1.2.1.75.1.4.2	<a href="#">86</a>
fcFxPortC2AccountingEntry	1.3.6.1.2.1.75.1.4.2.1	<a href="#">86</a>
fcFxPortC2InFrames	1.3.6.1.2.1.75.1.4.2.1.1	<a href="#">86</a>
fcFxPortC2OutFrames	1.3.6.1.2.1.75.1.4.2.1.2	<a href="#">86</a>
fcFxPortC2InOctets	1.3.6.1.2.1.75.1.4.2.1.3	<a href="#">86</a>
fcFxPortC2OutOctets	1.3.6.1.2.1.75.1.4.2.1.4	<a href="#">86</a>
fcFxPortC2Discards	1.3.6.1.2.1.75.1.4.2.1.5	<a href="#">87</a>
fcFxPortC2FbsyFrames	1.3.6.1.2.1.75.1.4.2.1.6	<a href="#">87</a>
fcFxPortC2FrjtFrames	1.3.6.1.2.1.75.1.4.2.1.7	<a href="#">87</a>
fcFxPortC3AccountingTable	1.3.6.1.2.1.75.1.4.3	<a href="#">87</a>
fcFxPortC3AccountingEntry	1.3.6.1.2.1.75.1.4.3.1	<a href="#">87</a>
fcFxPortC3InFrames	1.3.6.1.2.1.75.1.4.3.1.1	<a href="#">87</a>
fcFxPortC3OutFrames	1.3.6.1.2.1.75.1.4.3.1.2	<a href="#">87</a>
fcFxPortC3InOctets	1.3.6.1.2.1.75.1.4.3.1.3	<a href="#">87</a>
fcFxPortC3OutOctets	1.3.6.1.2.1.75.1.4.3.1.4	<a href="#">87</a>
fcFxPortC3Discards	1.3.6.1.2.1.75.1.4.3.1.5	<a href="#">88</a>
fcFeCapabilities	1.3.6.1.2.1.75.1.5	<a href="#">70</a>

**Table 27** MIB object name and OID matrix (continued)

MIB Object Name	OID	Page
fcFxPortCapTable	1.3.6.1.2.1.75.1.5.1	88
fcFxPortCapEntry	1.3.6.1.2.1.75.1.5.1.1	88
fcFxPortCapFcphVersionHigh	1.3.6.1.2.1.75.1.5.1.1.1	88
fcFxPortCapFcphVersionLow	1.3.6.1.2.1.75.1.5.1.1.2	88
fcFxPortCapBbCreditMax	1.3.6.1.2.1.75.1.5.1.1.3	88
fcFxPortCapBbCreditMin	1.3.6.1.2.1.75.1.5.1.1.4	88
fcFxPortCapRxDataFieldSizeMax	1.3.6.1.2.1.75.1.5.1.1.5	89
fcFxPortCapRxDataFieldSizeMin	1.3.6.1.2.1.75.1.5.1.1.6	89
fcFxPortCapCos	1.3.6.1.2.1.75.1.5.1.1.7	89
fcFxPortCapIntermix	1.3.6.1.2.1.75.1.5.1.1.8	89
fcFxPortCapStackedConnMode	1.3.6.1.2.1.75.1.5.1.1.9	89
fcFxPortCapClass2SeqDeliv	1.3.6.1.2.1.75.1.5.1.1.10	89
fcFxPortCapClass3SeqDeliv	1.3.6.1.2.1.75.1.5.1.1.11	89
fcFxPortCapHoldTimeMax	1.3.6.1.2.1.75.1.5.1.1.12	89
fcFxPortCapHoldTimeMin	1.3.6.1.2.1.75.1.5.1.1.13	90
fcFeMIBConformance	1.3.6.1.2.1.75.2	68
fcFeMIBCompliances	1.3.6.1.2.1.75.2.1	68
fcFeMIBMinimumCompliance	1.3.6.1.2.1.75.2.1.1	n/a
fcFeMIBFullCompliance	1.3.6.1.2.1.75.2.1.2	n/a
fcFeMIBGroups	1.3.6.1.2.1.75.2.2	68
fcFeConfigGroup	1.3.6.1.2.1.75.2.2.1	n/a
fcFeStatusGroup	1.3.6.1.2.1.75.2.2.2	n/a
fcFeErrorGroup	1.3.6.1.2.1.75.2.2.3	n/a
fcFeClass1AccountingGroup	1.3.6.1.2.1.75.2.2.4	n/a
fcFeClass2AccountingGroup	1.3.6.1.2.1.75.2.2.5	n/a
fcFeClass3AccountingGroup	1.3.6.1.2.1.75.2.2.6	n/a
fcFeCapabilitiesGroup	1.3.6.1.2.1.75.2.2.7	n/a
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fibreChannel	1.3.6.1.3.42	91
fcFabric	1.3.6.1.3.42.2	91
fcFe	1.3.6.1.3.42.2.1	91
fcFeConfig	1.3.6.1.3.42.2.1.1	68
fcFabricName	1.3.6.1.3.42.2.1.1.1	96
fcElementName	1.3.6.1.3.42.2.1.1.2	96
fcFeModuleCapacity	1.3.6.1.3.42.2.1.1.3	96
fcFeModuleTable	1.3.6.1.3.42.2.1.1.4	97
fcFeModuleEntry	1.3.6.1.3.42.2.1.1.4.1	97
fcFeModuleIndex	1.3.6.1.3.42.2.1.1.4.1.1	97
fcFeModuleDescr	1.3.6.1.3.42.2.1.1.4.1.2	97

**Table 27** MIB object name and OID matrix (continued)

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fcFeModuleObjectID	1.3.6.1.3.42.2.1.1.4.1.3	<a href="#">97</a>
fcFeModuleOperStatus	1.3.6.1.3.42.2.1.1.4.1.4	<a href="#">97</a>
fcFeModuleLastChange	1.3.6.1.3.42.2.1.1.4.1.5	<a href="#">98</a>
fcFeModuleFxpPortCapacity	1.3.6.1.3.42.2.1.1.4.1.6	<a href="#">98</a>
fcFeModuleName	1.3.6.1.3.42.2.1.1.4.1.7	<a href="#">98</a>
fcFxCnfTable	1.3.6.1.3.42.2.1.1.5	<a href="#">98</a>
fcFxCnfEntry	1.3.6.1.3.42.2.1.1.5.1	<a href="#">98</a>
fcFxCnfModuleIndex	1.3.6.1.3.42.2.1.1.5.1.1	<a href="#">98</a>
fcFxCnfFxpPortIndex	1.3.6.1.3.42.2.1.1.5.1.2	<a href="#">98</a>
fcFxpPortName	1.3.6.1.3.42.2.1.1.5.1.3	<a href="#">99</a>
fcFxpPortFcphVersionHigh	1.3.6.1.3.42.2.1.1.5.1.4	<a href="#">99</a>
fcFxpPortFcphVersionLow	1.3.6.1.3.42.2.1.1.5.1.5	<a href="#">99</a>
fcFxpPortBbCredit	1.3.6.1.3.42.2.1.1.5.1.6	<a href="#">99</a>
fcFxpPortRxBufSize	1.3.6.1.3.42.2.1.1.5.1.7	<a href="#">99</a>
fcFxpPortRatov	1.3.6.1.3.42.2.1.1.5.1.8	<a href="#">99</a>
fcFxpPortEdtov	1.3.6.1.3.42.2.1.1.5.1.9	<a href="#">99</a>
fcFxpPortCosSupported	1.3.6.1.3.42.2.1.1.5.1.10	<a href="#">99</a>
fcFxpPortIntermixSupported	1.3.6.1.3.42.2.1.1.5.1.11	<a href="#">100</a>
fcFxpPortStackedConnMode	1.3.6.1.3.42.2.1.1.5.1.12	<a href="#">100</a>
fcFxpPortClass2SeqDeliv	1.3.6.1.3.42.2.1.1.5.1.13	<a href="#">100</a>
fcFxpPortClass3SeqDeliv	1.3.6.1.3.42.2.1.1.5.1.14	<a href="#">100</a>
fcFxpPortHoldTime	1.3.6.1.3.42.2.1.1.5.1.15	<a href="#">100</a>
fcFxpPortBaudRate	1.3.6.1.3.42.2.1.1.5.1.16	<a href="#">100</a>
fcFxpPortMedium	1.3.6.1.3.42.2.1.1.5.1.17	<a href="#">100</a>
fcFxpPortTxType	1.3.6.1.3.42.2.1.1.5.1.18	<a href="#">100</a>
fcFxpPortDistance	1.3.6.1.3.42.2.1.1.5.1.19	<a href="#">101</a>
fcFeOp	1.3.6.1.3.42.2.1.2	<a href="#">92</a>
fcFxpPortOperTable	1.3.6.1.3.42.2.1.2.1	<a href="#">101</a>
fcFxpPortOperEntry	1.3.6.1.3.42.2.1.2.1.1	<a href="#">101</a>
fcFxpPortOperModuleIndex	1.3.6.1.3.42.2.1.2.1.1.1	<a href="#">101</a>
fcFxpPortOperFxpPortIndex	1.3.6.1.3.42.2.1.2.1.1.2	<a href="#">101</a>
fcFxpPortID	1.3.6.1.3.42.2.1.2.1.1.3	<a href="#">101</a>
fcFxpPortAttachedPortName	1.3.6.1.3.42.2.1.2.1.1.4	<a href="#">102</a>
fcFxpPortConnectedPort	1.3.6.1.3.42.2.1.2.1.1.5	<a href="#">102</a>
fcFxpPortBbCreditAvailable	1.3.6.1.3.42.2.1.2.1.1.6	<a href="#">102</a>
fcFxpPortOperMode	1.3.6.1.3.42.2.1.2.1.1.7	<a href="#">102</a>
fcFxpPortAdminMode	1.3.6.1.3.42.2.1.2.1.1.8	<a href="#">102</a>
fcFxpPortPhysTable	1.3.6.1.3.42.2.1.2.3	<a href="#">102</a>
fcFxpPortPhysEntry	1.3.6.1.3.42.2.1.2.3.1	<a href="#">102</a>

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fcFxPortPhysFxPortIndex	1.3.6.1.3.42.2.1.2.3.1.2	103
fcFxPortPhysAdminStatus	1.3.6.1.3.42.2.1.2.3.1.3	103
fcFxPortPhysOperStatus	1.3.6.1.3.42.2.1.2.3.1.4	103
fcFxPortPhysLastChange	1.3.6.1.3.42.2.1.2.3.1.5	103
fcFxPortPhysRttov	1.3.6.1.3.42.2.1.2.3.1.6	104
fcFxlogiTable	1.3.6.1.3.42.2.1.2.4	104
fcFxlogiEntry	1.3.6.1.3.42.2.1.2.4.1	104
fcFxlogiModuleIndex	1.3.6.1.3.42.2.1.2.4.1.1	104
fcFxlogiFxPortIndex	1.3.6.1.3.42.2.1.2.4.1.2	104
fcFxlogiNxPortIndex	1.3.6.1.3.42.2.1.2.4.1.3	104
fcFxPortFcphVersionAgreed	1.3.6.1.3.42.2.1.2.4.1.4	104
fcFxPortNxPortBbCredit	1.3.6.1.3.42.2.1.2.4.1.5	105
fcFxPortNxPortRxDataFieldSize	1.3.6.1.3.42.2.1.2.4.1.6	105
fcFxPortCosSuppAgreed	1.3.6.1.3.42.2.1.2.4.1.7	105
fcFxPortIntermixSuppAgreed	1.3.6.1.3.42.2.1.2.4.1.8	105
fcFxPortStackedConnModeAgreed	1.3.6.1.3.42.2.1.2.4.1.9	105
fcFxPortClass2SeqDelivAgreed	1.3.6.1.3.42.2.1.2.4.1.10	105
fcFxPortClass3SeqDelivAgreed	1.3.6.1.3.42.2.1.2.4.1.11	105
fcFxPortNxPortName	1.3.6.1.3.42.2.1.2.4.1.12	106
fcFxPortConnectedNxPort	1.3.6.1.3.42.2.1.2.4.1.13	106
fcFxPortBbCreditModel	1.3.6.1.3.42.2.1.2.4.1.14	106
fcFeError	1.3.6.1.3.42.2.1.3	69
fcFxPortErrorTable	1.3.6.1.3.42.2.1.3.1	106
fcFxPortErrorEntry	1.3.6.1.3.42.2.1.3.1.1	106
fcFxPortErrorModuleIndex	1.3.6.1.3.42.2.1.3.1.1.1	106
fcFxPortErrorFxPortIndex	1.3.6.1.3.42.2.1.3.1.1.2	107
fcFxPortLinkFailures	1.3.6.1.3.42.2.1.3.1.1.3	107
fcFxPortSyncLosses	1.3.6.1.3.42.2.1.3.1.1.4	107
fcFxPortSigLosses	1.3.6.1.3.42.2.1.3.1.1.5	107
fcFxPortPrimSeqProtoErrors	1.3.6.1.3.42.2.1.3.1.1.6	107
fcFxPortInvalidTxWords	1.3.6.1.3.42.2.1.3.1.1.7	107
fcFxPortInvalidCrcs	1.3.6.1.3.42.2.1.3.1.1.8	107
fcFxPortDelimiterErrors	1.3.6.1.3.42.2.1.3.1.1.9	107
fcFxPortAddressIdErrors	1.3.6.1.3.42.2.1.3.1.1.10	107
fcFxPortLinkResetIns	1.3.6.1.3.42.2.1.3.1.1.11	108
fcFxPortLinkResetOuts	1.3.6.1.3.42.2.1.3.1.1.12	108
fcFxPortOlsIns	1.3.6.1.3.42.2.1.3.1.1.13	108
fcFxPortOlsOuts	1.3.6.1.3.42.2.1.3.1.1.14	108



**Table 27** MIB object name and OID matrix (continued)

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fcFeCap	1.3.6.1.3.42.2.1.5	<a href="#">93</a>
fcFxFPortCapTable	1.3.6.1.3.42.2.1.5.1	<a href="#">108</a>
fcFxFPortCapEntry	1.3.6.1.3.42.2.1.5.1.1	<a href="#">108</a>
fcFxFPortCapModuleIndex	1.3.6.1.3.42.2.1.5.1.1.1	<a href="#">108</a>
fcFxFPortCapFxFPortIndex	1.3.6.1.3.42.2.1.5.1.1.2	<a href="#">109</a>
fcFxFPortCapFcphVersionHigh	1.3.6.1.3.42.2.1.5.1.1.3	<a href="#">109</a>
fcFxFPortCapFcphVersionLow	1.3.6.1.3.42.2.1.5.1.1.4	<a href="#">109</a>
fcFxFPortCapBbCreditMax	1.3.6.1.3.42.2.1.5.1.1.5	<a href="#">109</a>
fcFxFPortCapBbCreditMin	1.3.6.1.3.42.2.1.5.1.1.6	<a href="#">109</a>
fcFxFPortCapRxDatFieldSizeMax	1.3.6.1.3.42.2.1.5.1.1.7	<a href="#">109</a>
fcFxFPortCapRxDatFieldSizeMin	1.3.6.1.3.42.2.1.5.1.1.8	<a href="#">109</a>
fcFxFPortCapCos	1.3.6.1.3.42.2.1.5.1.1.9	<a href="#">109</a>
fcFxFPortCapIntermix	1.3.6.1.3.42.2.1.5.1.1.10	<a href="#">110</a>
fcFxFPortCapStackedConnMode	1.3.6.1.3.42.2.1.5.1.1.11	<a href="#">110</a>
fcFxFPortCapClass2SeqDeliv	1.3.6.1.3.42.2.1.5.1.1.12	<a href="#">110</a>
fcFxFPortCapClass3SeqDeliv	1.3.6.1.3.42.2.1.5.1.1.13	<a href="#">110</a>
fcFxFPortCapHoldTimeMax	1.3.6.1.3.42.2.1.5.1.1.14	<a href="#">110</a>
fcFxFPortCapHoldTimeMin	1.3.6.1.3.42.2.1.5.1.1.15	<a href="#">110</a>
fcFxFPortCapBaudRates	1.3.6.1.3.42.2.1.5.1.1.16	<a href="#">110</a>
fcFxFPortCapMedia	1.3.6.1.3.42.2.1.5.1.1.17	<a href="#">110</a>
fcmgmt	1.3.6.1.3.94	<a href="#">210</a>
connSet	1.3.6.1.3.94.1	<a href="#">216</a>
uNumber	1.3.6.1.3.94.1.1	<a href="#">216</a>
systemURL	1.3.6.1.3.94.1.2	<a href="#">216</a>
connUnitTable	1.3.6.1.3.94.1.6	<a href="#">217</a>
connUnitEntry	1.3.6.1.3.94.1.6.1	<a href="#">217</a>
connUnitId	1.3.6.1.3.94.1.6.1.1	<a href="#">217</a>
connUnitGlobalId	1.3.6.1.3.94.1.6.1.2	<a href="#">218</a>
connUnitType	1.3.6.1.3.94.1.6.1.3	<a href="#">219</a>
connUnitNumports	1.3.6.1.3.94.1.6.1.4	<a href="#">219</a>
connUnitState	1.3.6.1.3.94.1.6.1.5	<a href="#">219</a>
connUnitStatus	1.3.6.1.3.94.1.6.1.6	<a href="#">220</a>
connUnitProduct	1.3.6.1.3.94.1.6.1.7	<a href="#">220</a>
connUnitSn	1.3.6.1.3.94.1.6.1.8	<a href="#">220</a>
connUnitUpTime	1.3.6.1.3.94.1.6.1.9	<a href="#">220</a>
connUnitUrl	1.3.6.1.3.94.1.6.1.10	<a href="#">220</a>
connUnitDomainId	1.3.6.1.3.94.1.6.1.11	<a href="#">221</a>
connUnitProxyMaster	1.3.6.1.3.94.1.6.1.12	<a href="#">221</a>

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connUnitNumSensors	1.3.6.1.3.94.1.6.1.14	<a href="#">221</a>
connUnitStatusChangeTime	1.3.6.1.3.94.1.6.1.15	<a href="#">221</a>
connUnitConfigurationChangeTime	1.3.6.1.3.94.1.6.1.16	<a href="#">222</a>
connUnitNumRevs	1.3.6.1.3.94.1.6.1.17	<a href="#">222</a>
connUnitNumZones	1.3.6.1.3.94.1.6.1.18	<a href="#">222</a>
connUnitModuleId	1.3.6.1.3.94.1.6.1.19	<a href="#">222</a>
connUnitName	1.3.6.1.3.94.1.6.1.20	<a href="#">222</a>
connUnitInfo	1.3.6.1.3.94.1.6.1.21	<a href="#">222</a>
connUnitControl	1.3.6.1.3.94.1.6.1.22	<a href="#">223</a>
connUnitContact	1.3.6.1.3.94.1.6.1.23	<a href="#">223</a>
connUnitLocation	1.3.6.1.3.94.1.6.1.24	<a href="#">223</a>
connUnitEventFilter	1.3.6.1.3.94.1.6.1.25	<a href="#">223</a>
connUnitNumEvents	1.3.6.1.3.94.1.6.1.26	<a href="#">224</a>
connUnitMaxEvents	1.3.6.1.3.94.1.6.1.27	<a href="#">224</a>
connUnitEventCurrID	1.3.6.1.3.94.1.6.1.28	<a href="#">224</a>
connUnitRevsTable	1.3.6.1.3.94.1.7	<a href="#">224</a>
connUnitRevsEntry	1.3.6.1.3.94.1.7.1	<a href="#">224</a>
connUnitRevsUnitId	1.3.6.1.3.94.1.7.1.1	<a href="#">224</a>
connUnitRevsIndex	1.3.6.1.3.94.1.7.1.2	<a href="#">225</a>
connUnitRevsRevId	1.3.6.1.3.94.1.7.1.3	<a href="#">225</a>
connUnitRevsDescription	1.3.6.1.3.94.1.7.1.4	<a href="#">225</a>
connUnitSensorTable	1.3.6.1.3.94.1.8	<a href="#">225</a>
connUnitSensorEntry	1.3.6.1.3.94.1.8.1	<a href="#">225</a>
connUnitSensorUnitId	1.3.6.1.3.94.1.8.1.1	<a href="#">225</a>
connUnitSensorIndex	1.3.6.1.3.94.1.8.1.2	<a href="#">225</a>
connUnitSensorName	1.3.6.1.3.94.1.8.1.3	<a href="#">226</a>
connUnitSensorStatus	1.3.6.1.3.94.1.8.1.4	<a href="#">226</a>
connUnitSensorInfo	1.3.6.1.3.94.1.8.1.5	<a href="#">226</a>
connUnitSensorMessage	1.3.6.1.3.94.1.8.1.6	<a href="#">226</a>
connUnitSensorType	1.3.6.1.3.94.1.8.1.7	<a href="#">226</a>
connUnitSensorCharacteristic	1.3.6.1.3.94.1.8.1.8	<a href="#">227</a>
connUnitPortTable	1.3.6.1.3.94.1.10	<a href="#">227</a>
connUnitPortEntry	1.3.6.1.3.94.1.10.1	<a href="#">227</a>
connUnitPortUnitId	1.3.6.1.3.94.1.10.1.1	<a href="#">228</a>
connUnitPortIndex	1.3.6.1.3.94.1.10.1.2	<a href="#">228</a>
connUnitPortType	1.3.6.1.3.94.1.10.1.3	<a href="#">228</a>
connUnitPortFCClassCap	1.3.6.1.3.94.1.10.1.4	<a href="#">229</a>
connUnitPortFCClassOp	1.3.6.1.3.94.1.10.1.5	<a href="#">229</a>

**Table 27** MIB object name and OID matrix (continued)

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connUnitPortStatus	1.3.6.1.3.94.1.10.1.7	<a href="#">230</a>
connUnitPortTransmitterType	1.3.6.1.3.94.1.10.1.8	<a href="#">230</a>
connUnitPortModuleType	1.3.6.1.3.94.1.10.1.9	<a href="#">230</a>
connUnitPortWwn	1.3.6.1.3.94.1.10.1.10	<a href="#">231</a>
connUnitPortFCId	1.3.6.1.3.94.1.10.1.11	<a href="#">231</a>
connUnitPortSn	1.3.6.1.3.94.1.10.1.12	<a href="#">231</a>
connUnitPortRevision	1.3.6.1.3.94.1.10.1.13	<a href="#">231</a>
connUnitPortVendor	1.3.6.1.3.94.1.10.1.14	<a href="#">231</a>
connUnitPortSpeed	1.3.6.1.3.94.1.10.1.15	<a href="#">232</a>
connUnitPortControl	1.3.6.1.3.94.1.10.1.16	<a href="#">232</a>
connUnitPortName	1.3.6.1.3.94.1.10.1.17	<a href="#">233</a>
connUnitPortPhysicalNumber	1.3.6.1.3.94.1.10.1.18	<a href="#">233</a>
connUnitPortStatObject	1.3.6.1.3.94.1.10.1.19	<a href="#">234</a>
connUnitPortProtocolCap	1.3.6.1.3.94.1.10.1.20	<a href="#">234</a>
connUnitPortProtocolOp	1.3.6.1.3.94.1.10.1.21	<a href="#">234</a>
connUnitPortNodeWwn	1.3.6.1.3.94.1.10.1.22	<a href="#">235</a>
connUnitPortHWState	1.3.6.1.3.94.1.10.1.23	<a href="#">235</a>
connUnitEventTable	1.3.6.1.3.94.1.11	<a href="#">235</a>
connUnitEventEntry	1.3.6.1.3.94.1.11.1	<a href="#">236</a>
connUnitEventUnitId	1.3.6.1.3.94.1.11.1.1	<a href="#">236</a>
connUnitEventIndex	1.3.6.1.3.94.1.11.1.2	<a href="#">236</a>
connUnitEventId	1.3.6.1.3.94.1.11.1.3	<a href="#">236</a>
connUnitREventTime	1.3.6.1.3.94.1.11.1.4	<a href="#">237</a>
connUnitSEventTime	1.3.6.1.3.94.1.11.1.5	<a href="#">237</a>
connUnitEventSeverity	1.3.6.1.3.94.1.11.1.6	<a href="#">237</a>
connUnitEventType	1.3.6.1.3.94.1.11.1.7	<a href="#">237</a>
connUnitEventObject	1.3.6.1.3.94.1.11.1.8	<a href="#">237</a>
connUnitEventDescr	1.3.6.1.3.94.1.11.1.9	<a href="#">238</a>
connUnitLinkTable	1.3.6.1.3.94.1.12	<a href="#">238</a>
connUnitLinkEntry	1.3.6.1.3.94.1.12.1	<a href="#">239</a>
connUnitLinkUnitId	1.3.6.1.3.94.1.12.1.1	<a href="#">239</a>
connUnitLinkIndex	1.3.6.1.3.94.1.12.1.2	<a href="#">239</a>
connUnitLinkNodeIdX	1.3.6.1.3.94.1.12.1.3	<a href="#">239</a>
connUnitLinkPortNumberX	1.3.6.1.3.94.1.12.1.4	<a href="#">239</a>
connUnitLinkPortWwnX	1.3.6.1.3.94.1.12.1.5	<a href="#">239</a>
connUnitLinkNodeIdY	1.3.6.1.3.94.1.12.1.6	<a href="#">240</a>
connUnitLinkPortNumberY	1.3.6.1.3.94.1.12.1.7	<a href="#">240</a>
connUnitLinkPortWwnY	1.3.6.1.3.94.1.12.1.8	<a href="#">240</a>

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connUnitLinkAgentAddressTypeY	1.3.6.1.3.94.1.12.1.10	<a href="#">240</a>
connUnitLinkAgentPortY	1.3.6.1.3.94.1.12.1.11	<a href="#">240</a>
connUnitLinkUnitTypeY	1.3.6.1.3.94.1.12.1.12	<a href="#">241</a>
connUnitLinkConnIdY	1.3.6.1.3.94.1.12.1.13	<a href="#">241</a>
connUnitLinkCurrIndex	1.3.6.1.3.94.1.12.1.14	<a href="#">241</a>
trapReg	1.3.6.1.3.94.2	<a href="#">213</a>
trapMaxClients	1.3.6.1.3.94.2.1	<a href="#">252</a>
trapClientCount	1.3.6.1.3.94.2.2	<a href="#">252</a>
trapRegTable	1.3.6.1.3.94.2.3	<a href="#">252</a>
trapRegEntry	1.3.6.1.3.94.2.3.1	<a href="#">253</a>
trapRegIpAddress	1.3.6.1.3.94.2.3.1.1	<a href="#">253</a>
trapRegPort	1.3.6.1.3.94.2.3.1.2	<a href="#">253</a>
trapRegFilter	1.3.6.1.3.94.2.3.1.3	<a href="#">253</a>
trapRegRowState	1.3.6.1.3.94.2.3.1.4	<a href="#">253</a>
revisionNumber	1.3.6.1.3.94.3	<a href="#">254</a>
statSet	1.3.6.1.3.94.4	<a href="#">210</a>
connUnitPortStatTable	1.3.6.1.3.94.4.5	<a href="#">241</a>
connUnitPortStatEntry	1.3.6.1.3.94.4.5.1	<a href="#">242</a>
connUnitPortStatUnitId	1.3.6.1.3.94.4.5.1.1	<a href="#">242</a>
connUnitPortStatIndex	1.3.6.1.3.94.4.5.1.2	<a href="#">242</a>
connUnitPortStatCountError	1.3.6.1.3.94.4.5.1.3	<a href="#">242</a>
connUnitPortStatCountTxObjects	1.3.6.1.3.94.4.5.1.4	<a href="#">242</a>
connUnitPortStatCountRxObjects	1.3.6.1.3.94.4.5.1.5	<a href="#">242</a>
connUnitPortStatCountTxElements	1.3.6.1.3.94.4.5.1.6	<a href="#">242</a>
connUnitPortStatCountRxElements	1.3.6.1.3.94.4.5.1.7	<a href="#">243</a>
connUnitPortStatCountBBCreditZero	1.3.6.1.3.94.4.5.1.8	<a href="#">243</a>
connUnitPortStatCountInputBuffersFull	1.3.6.1.3.94.4.5.1.9	<a href="#">243</a>
connUnitPortStatCountFBSYFrames	1.3.6.1.3.94.4.5.1.10	<a href="#">243</a>
connUnitPortStatCountPBSYFrames	1.3.6.1.3.94.4.5.1.11	<a href="#">243</a>
connUnitPortStatCountFRJTFrames	1.3.6.1.3.94.4.5.1.12	<a href="#">244</a>
connUnitPortStatCountPRJTFrames	1.3.6.1.3.94.4.5.1.13	<a href="#">244</a>
connUnitPortStatCountClass1RxFrames	1.3.6.1.3.94.4.5.1.14	<a href="#">244</a>
connUnitPortStatCountClass1TxFrames	1.3.6.1.3.94.4.5.1.15	<a href="#">244</a>
connUnitPortStatCountClass1FBSYFrames	1.3.6.1.3.94.4.5.1.16	<a href="#">244</a>
connUnitPortStatCountClass1PBSYFrames	1.3.6.1.3.94.4.5.1.17	<a href="#">244</a>
connUnitPortStatCountClass1FRJTFrames	1.3.6.1.3.94.4.5.1.18	<a href="#">245</a>
connUnitPortStatCountClass1PRJTFrames	1.3.6.1.3.94.4.5.1.19	<a href="#">245</a>
connUnitPortStatCountClass2RxFrames	1.3.6.1.3.94.4.5.1.20	<a href="#">245</a>

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connUnitPortStatCountClass2FBSYFrames	1.3.6.1.3.94.4.5.1.22	<a href="#">245</a>
connUnitPortStatCountClass2PBSYFrames	1.3.6.1.3.94.4.5.1.23	<a href="#">246</a>
connUnitPortStatCountClass2FRJTFrames	1.3.6.1.3.94.4.5.1.24	<a href="#">246</a>
connUnitPortStatCountClass2PRJTFrames	1.3.6.1.3.94.4.5.1.25	<a href="#">246</a>
connUnitPortStatCountClass3RxFrames	1.3.6.1.3.94.4.5.1.26	<a href="#">246</a>
connUnitPortStatCountClass3TxFrames	1.3.6.1.3.94.4.5.1.27	<a href="#">246</a>
connUnitPortStatCountClass3Discards	1.3.6.1.3.94.4.5.1.28	<a href="#">246</a>
connUnitPortStatCountRxMulticastObjects	1.3.6.1.3.94.4.5.1.29	<a href="#">247</a>
connUnitPortStatCountTxMulticastObjects	1.3.6.1.3.94.4.5.1.30	<a href="#">247</a>
connUnitPortStatCountRxBroadcastObjects	1.3.6.1.3.94.4.5.1.31	<a href="#">247</a>
connUnitPortStatCountTxBroadcastObjects	1.3.6.1.3.94.4.5.1.32	<a href="#">247</a>
connUnitPortStatCountRxLinkResets	1.3.6.1.3.94.4.5.1.33	<a href="#">247</a>
connUnitPortStatCountTxLinkResets	1.3.6.1.3.94.4.5.1.34	<a href="#">247</a>
connUnitPortStatCountNumberLinkResets	1.3.6.1.3.94.4.5.1.35	<a href="#">247</a>
connUnitPortStatCountRxOfflineSequences	1.3.6.1.3.94.4.5.1.36	<a href="#">248</a>
connUnitPortStatCountTxOfflineSequences	1.3.6.1.3.94.4.5.1.37	<a href="#">248</a>
connUnitPortStatCountNumberOffline Sequences	1.3.6.1.3.94.4.5.1.38	<a href="#">248</a>
connUnitPortStatCountLinkFailures	1.3.6.1.3.94.4.5.1.39	<a href="#">248</a>
connUnitPortStatCountInvalidCRC	1.3.6.1.3.94.4.5.1.40	<a href="#">248</a>
connUnitPortStatCountInvalidTxWords	1.3.6.1.3.94.4.5.1.41	<a href="#">248</a>
connUnitPortStatCountPrimitiveSequenceProtocolErrors	1.3.6.1.3.94.4.5.1.42	<a href="#">248</a>
connUnitPortStatCountLosofSignal	1.3.6.1.3.94.4.5.1.43	<a href="#">249</a>
connUnitPortStatCountLosofSynchronization	1.3.6.1.3.94.4.5.1.44	<a href="#">249</a>
connUnitPortStatCountInvalidOrderedSets	1.3.6.1.3.94.4.5.1.45	<a href="#">249</a>
connUnitPortStatCountFramesTooLong	1.3.6.1.3.94.4.5.1.46	<a href="#">249</a>
connUnitPortStatCountFramesTruncated	1.3.6.1.3.94.4.5.1.47	<a href="#">249</a>
connUnitPortStatCountAddressErrors	1.3.6.1.3.94.4.5.1.48	<a href="#">249</a>
connUnitPortStatCountDelimiterErrors	1.3.6.1.3.94.4.5.1.49	<a href="#">250</a>
connUnitPortStatCountEncodingDisparityErrors	1.3.6.1.3.94.4.5.1.50	<a href="#">250</a>
connUnitServiceSet	1.3.6.1.3.94.5	<a href="#">214</a>
connUnitServiceScalars	1.3.6.1.3.94.5.1	<a href="#">214</a>
connUnitSnsMaxEntry	1.3.6.1.3.94.5.1.1	<a href="#">250</a>
connUnitServiceTables	1.3.6.1.3.94.5.2	<a href="#">215</a>
connUnitSnsTable	1.3.6.1.3.94.5.2.1	<a href="#">250</a>
connUnitSnsEntry	1.3.6.1.3.94.5.2.1.1	<a href="#">250</a>
connUnitSnsId	1.3.6.1.3.94.5.2.1.1.1	<a href="#">250</a>
connUnitSnsPortIndex	1.3.6.1.3.94.5.2.1.1.2	<a href="#">251</a>
connUnitSnsPortIdentifier	1.3.6.1.3.94.5.2.1.1.3	<a href="#">251</a>

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connUnitSnsNodeName	1.3.6.1.3.94.5.2.1.1.5	<a href="#">251</a>
connUnitSnsClassOfSvc	1.3.6.1.3.94.5.2.1.1.6	<a href="#">251</a>
connUnitSnsNodeIPAddress	1.3.6.1.3.94.5.2.1.1.7	<a href="#">251</a>
connUnitSnsProcAssoc	1.3.6.1.3.94.5.2.1.1.8	<a href="#">251</a>
connUnitSnsFC4Type	1.3.6.1.3.94.5.2.1.1.9	<a href="#">251</a>
connUnitSnsPortType	1.3.6.1.3.94.5.2.1.1.10	<a href="#">251</a>
connUnitSnsPortIPAddress	1.3.6.1.3.94.5.2.1.1.11	<a href="#">252</a>
connUnitSnsFabricPortName	1.3.6.1.3.94.5.2.1.1.12	<a href="#">252</a>
connUnitSnsHardAddress	1.3.6.1.3.94.5.2.1.1.13	<a href="#">252</a>
connUnitSnsSymbolicPortName	1.3.6.1.3.94.5.2.1.1.14	<a href="#">252</a>
connUnitSnsSymbolicNodeName	1.3.6.1.3.94.5.2.1.1.15	<a href="#">252</a>
private	1.3.6.1.4	<a href="#">134</a>
enterprises	1.3.6.1.4.1	<a href="#">134</a>
bcsi	1.3.6.1.4.1.1588	<a href="#">134</a>
commDev	1.3.6.1.4.1.1588.2	<a href="#">134</a>
fibrechannel	1.3.6.1.4.1.1588.2.1	<a href="#">134</a>
fcSwitch	1.3.6.1.4.1.1588.2.1.1	<a href="#">134</a>
sw	1.3.6.1.4.1.1588.2.1.1.1	<a href="#">134</a>
swSystem	1.3.6.1.4.1.1588.2.1.1.1.1	<a href="#">135</a>
swCurrentDate	1.3.6.1.4.1.1588.2.1.1.1.1.1	<a href="#">146</a>
swBootDate	1.3.6.1.4.1.1588.2.1.1.1.1.2	<a href="#">146</a>
swFWLastUpdated	1.3.6.1.4.1.1588.2.1.1.1.1.3	<a href="#">147</a>
swFlashLastUpdated	1.3.6.1.4.1.1588.2.1.1.1.1.4	<a href="#">147</a>
swBootPromLastUpdated	1.3.6.1.4.1.1588.2.1.1.1.1.5	<a href="#">148</a>
swFirmwareVersion	1.3.6.1.4.1.1588.2.1.1.1.1.6	<a href="#">148</a>
swOperStatus	1.3.6.1.4.1.1588.2.1.1.1.1.7	<a href="#">148</a>
swAdmStatus	1.3.6.1.4.1.1588.2.1.1.1.1.8	<a href="#">149</a>
swTelnetShellAdmStatus	1.3.6.1.4.1.1588.2.1.1.1.1.9	<a href="#">149</a>
swSsn	1.3.6.1.4.1.1588.2.1.1.1.1.10	<a href="#">149</a>
swFlashDLOperStatus	1.3.6.1.4.1.1588.2.1.1.1.1.11	<a href="#">150</a>
swFlashDLAdmStatus	1.3.6.1.4.1.1588.2.1.1.1.1.12	<a href="#">150</a>
swFlashDLHost	1.3.6.1.4.1.1588.2.1.1.1.1.13	<a href="#">150</a>
swFlashDLUser	1.3.6.1.4.1.1588.2.1.1.1.1.14	<a href="#">150</a>
swFlashDLFile	1.3.6.1.4.1.1588.2.1.1.1.1.15	<a href="#">151</a>
swFlashDLPassword	1.3.6.1.4.1.1588.2.1.1.1.1.16	<a href="#">151</a>
swBeaconOperStatus	1.3.6.1.4.1.1588.2.1.1.1.1.18	<a href="#">151</a>
swBeaconAdmStatus	1.3.6.1.4.1.1588.2.1.1.1.1.19	<a href="#">151</a>
swDiagResult	1.3.6.1.4.1.1588.2.1.1.1.1.20	<a href="#">151</a>

**Table 27** MIB object name and OID matrix (continued)

MIB Object Name	OID	Page
swNumSensors	1.3.6.1.4.1.1588.2.1.1.1.1.21	<a href="#">151</a>
swSensorTable	1.3.6.1.4.1.1588.2.1.1.1.1.22	<a href="#">151</a>
swSensorEntry	1.3.6.1.4.1.1588.2.1.1.1.1.22.1	<a href="#">152</a>
swSensorIndex	1.3.6.1.4.1.1588.2.1.1.1.1.22.1.1	<a href="#">152</a>
swSensorType	1.3.6.1.4.1.1588.2.1.1.1.1.22.1.2	<a href="#">152</a>
swSensorStatus	1.3.6.1.4.1.1588.2.1.1.1.1.22.1.3	<a href="#">153</a>
swSensorValue	1.3.6.1.4.1.1588.2.1.1.1.1.22.1.4	<a href="#">153</a>
swSensorInfo	1.3.6.1.4.1.1588.2.1.1.1.1.22.1.5	<a href="#">153</a>
swTrackChangesInfo	1.3.6.1.4.1.1588.2.1.1.1.1.23	<a href="#">153</a>
swFabric	1.3.6.1.4.1.1588.2.1.1.1.2	<a href="#">135</a>
swDomainID	1.3.6.1.4.1.1588.2.1.1.1.2.1	<a href="#">154</a>
swPrincipalSwitch	1.3.6.1.4.1.1588.2.1.1.1.2.2	<a href="#">154</a>
swNumNbs	1.3.6.1.4.1.1588.2.1.1.1.2.8	<a href="#">154</a>
swNbTable	1.3.6.1.4.1.1588.2.1.1.1.2.9	<a href="#">155</a>
swNbEntry	1.3.6.1.4.1.1588.2.1.1.1.2.9.1	<a href="#">155</a>
swNbIndex	1.3.6.1.4.1.1588.2.1.1.1.2.9.1.1	<a href="#">155</a>
swNbMyPort	1.3.6.1.4.1.1588.2.1.1.1.2.9.1.2	<a href="#">155</a>
swNbRemDomain	1.3.6.1.4.1.1588.2.1.1.1.2.9.1.3	<a href="#">155</a>
swNbRemPort	1.3.6.1.4.1.1588.2.1.1.1.2.9.1.4	<a href="#">155</a>
swNbBaudRate	1.3.6.1.4.1.1588.2.1.1.1.2.9.1.5	<a href="#">156</a>
swNbIsState	1.3.6.1.4.1.1588.2.1.1.1.2.9.1.6	<a href="#">156</a>
swNbIsCost	1.3.6.1.4.1.1588.2.1.1.1.2.9.1.7	<a href="#">156</a>
swNbRemPortName	1.3.6.1.4.1.1588.2.1.1.1.2.9.1.8	<a href="#">156</a>
swModule	1.3.6.1.4.1.1588.2.1.1.1.3	<a href="#">136</a>
swAgtCfg	1.3.6.1.4.1.1588.2.1.1.1.4	<a href="#">136</a>
swAgtCmtyTable	1.3.6.1.4.1.1588.2.1.1.1.4.11	<a href="#">158</a>
swAgtCmtyEntry	1.3.6.1.4.1.1588.2.1.1.1.4.11.1	<a href="#">158</a>
swAgtCmtyIdx	1.3.6.1.4.1.1588.2.1.1.1.4.11.1.1	<a href="#">158</a>
swAgtCmtyStr	1.3.6.1.4.1.1588.2.1.1.1.4.11.1.2	<a href="#">158</a>
swAgtTrapRcp	1.3.6.1.4.1.1588.2.1.1.1.4.11.1.3	<a href="#">158</a>
swFCport	1.3.6.1.4.1.1588.2.1.1.1.6	<a href="#">136</a>
swFCPortCapacity	1.3.6.1.4.1.1588.2.1.1.1.6.1	<a href="#">159</a>
swFCPortTable	1.3.6.1.4.1.1588.2.1.1.1.6.2	<a href="#">159</a>
swFCPortEntry	1.3.6.1.4.1.1588.2.1.1.1.6.2.1	<a href="#">159</a>
swFCPortIndex	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.1	<a href="#">160</a>
swFCPortType	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.2	<a href="#">160</a>
swFCPortPhyState	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.3	<a href="#">160</a>
swFCPortOpStatus	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.4	<a href="#">160</a>
swFCPortAdmStatus	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.5	<a href="#">161</a>

**Table 27** MIB object name and OID matrix (continued)

MIB Object Name	OID	Page
swFCPortLinkState	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.6	<a href="#">161</a>
swFCPortTxType	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.7	<a href="#">161</a>
swFCPortTxWords	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.11	<a href="#">161</a>
swFCPortRxWords	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.12	<a href="#">161</a>
swFCPortTxFrames	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.13	<a href="#">162</a>
swFCPortRxFrames	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.14	<a href="#">162</a>
swFCPortRxC2Frames	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.15	<a href="#">162</a>
swFCPortRxC3Frames	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.16	<a href="#">162</a>
swFCPortRxCs	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.17	<a href="#">162</a>
swFCPortRxCasts	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.18	<a href="#">162</a>
swFCPortTooManyRdys	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.19	<a href="#">162</a>
swFCPortNoTxCredits	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.20	<a href="#">162</a>
swFCPortRxEnclnFrs	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.21	<a href="#">162</a>
swFCPortRxCrcs	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.22	<a href="#">162</a>
swFCPortRxTruncs	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.23	<a href="#">163</a>
swFCPortRxTooLongs	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.24	<a href="#">163</a>
swFCPortRxBadEofs	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.25	<a href="#">163</a>
swFCPortRxEncOutFrs	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.26	<a href="#">163</a>
swFCPortRxBadOs	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.27	<a href="#">163</a>
swFCPortC3Discards	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.28	<a href="#">163</a>
swFCPortMcastTimedOuts	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.29	<a href="#">163</a>
swFCPortTxMcasts	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.30	<a href="#">163</a>
swFCPortLipIns	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.31	<a href="#">163</a>
swFCPortLipOuts	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.32	<a href="#">164</a>
swFCPortLipLastAlpa	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.33	<a href="#">164</a>
swFCPortWwn	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.34	<a href="#">164</a>
swFCPortSpeed	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.35	<a href="#">164</a>
swNs	1.3.6.1.4.1.1588.2.1.1.1.7	<a href="#">137</a>
swNsLocalNumEntry	1.3.6.1.4.1.1588.2.1.1.1.7.1	<a href="#">165</a>
swNsLocalTable	1.3.6.1.4.1.1588.2.1.1.1.7.2	<a href="#">165</a>
swNsLocalEntry	1.3.6.1.4.1.1588.2.1.1.1.7.2.1	<a href="#">165</a>
swNsEntryIndex	1.3.6.1.4.1.1588.2.1.1.1.7.2.1.1	<a href="#">165</a>
swNsPortID	1.3.6.1.4.1.1588.2.1.1.1.7.2.1.2	<a href="#">165</a>
swNsPortType	1.3.6.1.4.1.1588.2.1.1.1.7.2.1.3	<a href="#">165</a>
swNsPortName	1.3.6.1.4.1.1588.2.1.1.1.7.2.1.4	<a href="#">165</a>
swNsPortSymb	1.3.6.1.4.1.1588.2.1.1.1.7.2.1.5	<a href="#">165</a>
swNsNodeName	1.3.6.1.4.1.1588.2.1.1.1.7.2.1.6	<a href="#">166</a>
swNsNodeSymb	1.3.6.1.4.1.1588.2.1.1.1.7.2.1.7	<a href="#">166</a>
swNsIPA	1.3.6.1.4.1.1588.2.1.1.1.7.2.1.8	<a href="#">166</a>



**Table 27** MIB object name and OID matrix (continued)

MIB Object Name	OID	Page
swNslpAddress	1.3.6.1.4.1.1588.2.1.1.1.7.2.1.9	<a href="#">166</a>
swNsCos	1.3.6.1.4.1.1588.2.1.1.1.7.2.1.10	<a href="#">166</a>
swNsFc4	1.3.6.1.4.1.1588.2.1.1.1.7.2.1.11	<a href="#">166</a>
swNslpNxPort	1.3.6.1.4.1.1588.2.1.1.1.7.2.1.12	<a href="#">166</a>
swNsWwn	1.3.6.1.4.1.1588.2.1.1.1.7.2.1.13	<a href="#">166</a>
swNsHardAddr	1.3.6.1.4.1.1588.2.1.1.1.7.2.1.14	<a href="#">166</a>
swEvent	1.3.6.1.4.1.1588.2.1.1.1.8	<a href="#">137</a>
swEventTrapLevel	1.3.6.1.4.1.1588.2.1.1.1.8.1	<a href="#">167</a>
swEventNumEntries	1.3.6.1.4.1.1588.2.1.1.1.8.4	<a href="#">167</a>
swEventTable	1.3.6.1.4.1.1588.2.1.1.1.8.5	<a href="#">167</a>
swEventEntry	1.3.6.1.4.1.1588.2.1.1.1.8.5.1	<a href="#">167</a>
swEventIndex	1.3.6.1.4.1.1588.2.1.1.1.8.5.1.1	<a href="#">167</a>
swEventTimeInfo	1.3.6.1.4.1.1588.2.1.1.1.8.5.1.2	<a href="#">168</a>
swEventLevel	1.3.6.1.4.1.1588.2.1.1.1.8.5.1.3	<a href="#">168</a>
swEventRepeatCount	1.3.6.1.4.1.1588.2.1.1.1.8.5.1.4	<a href="#">168</a>
swEventDescr	1.3.6.1.4.1.1588.2.1.1.1.8.5.1.5	<a href="#">168</a>
swFwSystem	1.3.6.1.4.1.1588.2.1.1.1.10	<a href="#">138</a>
swFwFabricWatchLicense	1.3.6.1.4.1.1588.2.1.1.1.10.1	<a href="#">169</a>
swFwClassAreaTable	1.3.6.1.4.1.1588.2.1.1.1.10.2	<a href="#">169</a>
swFwClassAreaEntry	1.3.6.1.4.1.1588.2.1.1.1.10.2.1	<a href="#">169</a>
swFwClassAreaIndex	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.1	<a href="#">169</a>
swFwWriteThVals	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.2	<a href="#">169</a>
swFwDefaultUnit	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.3	<a href="#">169</a>
swFwDefaultTimebase	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.4	<a href="#">170</a>
swFwDefaultLow	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.5	<a href="#">170</a>
swFwDefaultHigh	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.6	<a href="#">170</a>
swFwDefaultBufSize	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.7	<a href="#">170</a>
swFwCustUnit	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.8	<a href="#">170</a>
swFwCustTimebase	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.9	<a href="#">170</a>
swFwCustLow	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.10	<a href="#">170</a>
swFwCustHigh	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.11	<a href="#">170</a>
swFwCustBufSize	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.12	<a href="#">171</a>
swFwThLevel	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.13	<a href="#">171</a>
swFwWriteActVals	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.14	<a href="#">171</a>
swFwDefaultChangedActs	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.15	<a href="#">171</a>
swFwDefaultExceededActs	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.16	<a href="#">172</a>
swFwDefaultBelowActs	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.17	<a href="#">172</a>
swFwDefaultAboveActs	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.18	<a href="#">172</a>
swFwDefaultInBetweenActs	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.19	<a href="#">172</a>

**Table 27** MIB object name and OID matrix (continued)

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swFwCustChangedActs	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.20	<a href="#">172</a>
swFwCustExceededActs	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.21	<a href="#">172</a>
swFwCustBelowActs	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.22	<a href="#">172</a>
swFwCustAboveActs	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.23	<a href="#">172</a>
swFwCustInBetweenActs	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.24	<a href="#">172</a>
swFwValidActs	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.25	<a href="#">173</a>
swFwActLevel	1.3.6.1.4.1.1588.2.1.1.1.10.2.1.26	<a href="#">173</a>
swFwThresholdTable	1.3.6.1.4.1.1588.2.1.1.1.10.3	<a href="#">173</a>
swFwThresholdEntry	1.3.6.1.4.1.1588.2.1.1.1.10.3.1	<a href="#">173</a>
swFwThresholdIndex	1.3.6.1.4.1.1588.2.1.1.1.10.3.1.1	<a href="#">174</a>
swFwStatus	1.3.6.1.4.1.1588.2.1.1.1.10.3.1.2	<a href="#">174</a>
swFwName	1.3.6.1.4.1.1588.2.1.1.1.10.3.1.3	<a href="#">174</a>
swFwLabel	1.3.6.1.4.1.1588.2.1.1.1.10.3.1.4	<a href="#">176</a>
swFwCurVal	1.3.6.1.4.1.1588.2.1.1.1.10.3.1.5	<a href="#">176</a>
swFwLastEvent	1.3.6.1.4.1.1588.2.1.1.1.10.3.1.6	<a href="#">176</a>
swFwLastEventVal	1.3.6.1.4.1.1588.2.1.1.1.10.3.1.7	<a href="#">176</a>
swFwLastEventTime	1.3.6.1.4.1.1588.2.1.1.1.10.3.1.8	<a href="#">176</a>
swFwLastState	1.3.6.1.4.1.1588.2.1.1.1.10.3.1.9	<a href="#">176</a>
swFwBehaviorType	1.3.6.1.4.1.1588.2.1.1.1.10.3.1.10	<a href="#">177</a>
swFwBehaviorInt	1.3.6.1.4.1.1588.2.1.1.1.10.3.1.11	<a href="#">177</a>
swEndDevice	1.3.6.1.4.1.1588.2.1.1.1.21	<a href="#">138</a>
swEndDeviceRlsTable	1.3.6.1.4.1.1588.2.1.1.1.21.1	<a href="#">177</a>
swEndDeviceRlsEntry	1.3.6.1.4.1.1588.2.1.1.1.21.1.1	<a href="#">177</a>
swEndDevicePort	1.3.6.1.4.1.1588.2.1.1.1.21.1.1.1	<a href="#">177</a>
swEndDeviceAlpa	1.3.6.1.4.1.1588.2.1.1.1.21.1.1.2	<a href="#">177</a>
swEndDevicePortID	1.3.6.1.4.1.1588.2.1.1.1.21.1.1.3	<a href="#">178</a>
swEndDeviceLinkFailure	1.3.6.1.4.1.1588.2.1.1.1.21.1.1.4	<a href="#">178</a>
swEndDeviceSyncLoss	1.3.6.1.4.1.1588.2.1.1.1.21.1.1.5	<a href="#">178</a>
swEndDeviceSigLoss	1.3.6.1.4.1.1588.2.1.1.1.21.1.1.6	<a href="#">178</a>
swEndDeviceProtoErr	1.3.6.1.4.1.1588.2.1.1.1.21.1.1.7	<a href="#">178</a>
swEndDeviceInvalidWord	1.3.6.1.4.1.1588.2.1.1.1.21.1.1.8	<a href="#">178</a>
swEndDeviceInvalidCRC	1.3.6.1.4.1.1588.2.1.1.1.21.1.1.9	<a href="#">178</a>
swBlmPerfMnt	1.3.6.1.4.1.1588.2.1.1.1.23	<a href="#">139</a>
swBlmPerfALPAMntTable	1.3.6.1.4.1.1588.2.1.1.1.23.1	<a href="#">180</a>
swBlmPerfALPAMntEntry	1.3.6.1.4.1.1588.2.1.1.1.23.1.1	<a href="#">180</a>
swBlmPerfAlpaPort	1.3.6.1.4.1.1588.2.1.1.1.23.1.1.1	<a href="#">180</a>
swBlmPerfAlpaIndx	1.3.6.1.4.1.1588.2.1.1.1.23.1.1.2	<a href="#">180</a>
swBlmPerfAlpa	1.3.6.1.4.1.1588.2.1.1.1.23.1.1.3	<a href="#">180</a>
swBlmPerfAlpaCRCCnt	1.3.6.1.4.1.1588.2.1.1.1.23.1.1.4	<a href="#">180</a>

**Table 27** MIB object name and OID matrix (continued)

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swBlmPerfEEMntTable	1.3.6.1.4.1.1588.2.1.1.1.23.2	<a href="#">180</a>
swBlmPerfEEMntEntry	1.3.6.1.4.1.1588.2.1.1.1.23.2.1	<a href="#">181</a>
swBlmPerfEEPort	1.3.6.1.4.1.1588.2.1.1.1.23.2.1.1	<a href="#">181</a>
swBlmPerfEERefKey	1.3.6.1.4.1.1588.2.1.1.1.23.2.1.2	<a href="#">181</a>
swBlmPerfEECRC	1.3.6.1.4.1.1588.2.1.1.1.23.2.1.3	<a href="#">181</a>
swBlmPerfEEFCWRx	1.3.6.1.4.1.1588.2.1.1.1.23.2.1.4	<a href="#">181</a>
swBlmPerfEEFCWTx	1.3.6.1.4.1.1588.2.1.1.1.23.2.1.5	<a href="#">181</a>
swBlmPerfEESid	1.3.6.1.4.1.1588.2.1.1.1.23.2.1.6	<a href="#">181</a>
swBlmPerfEEDid	1.3.6.1.4.1.1588.2.1.1.1.23.2.1.7	<a href="#">181</a>
swBlmPerfFltMntTable	1.3.6.1.4.1.1588.2.1.1.1.23.3	<a href="#">181</a>
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swTrunkGrpNumber	1.3.6.1.4.1.1588.2.1.1.1.24.3.1.1	<a href="#">183</a>
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